AMERICAN JOURNAL OF OPHTHALMOLOGY

VOLUME 20 SEPTEMBER, 1937 NUMBER 9

AN EXPERIMENTAL STUDY OF CHOKED DISC IN THE RAT

W. A. JEFFERS, M.D. AND J. Q. GRIFFITH, JR., M.D.*

AND

W. E. FRY, M.D. AND A. G. FEWELL, M.D.†

Philadelphia

We have recently presented evidence that in the rat fluid normally passes from the cerebrospinal space toward the eye.[1] It was demonstrated that this normal flow could be interfered with, or actually blocked, by injecting colloidal kaolin (Collosol-Crookes) into the cisterna magna. It was determined further that the eyegrounds were not abnormal following the injection of kaolin, in spite of the fact that the tension of the cerebrospinal fluid had increased two- or threefold. The present report concerns an attempt to produce papilledema in the rat and to study the effect of a previous intracisternal injection of kaolin upon the occurrence of changes in the eye.

METHOD

Small pieces of a readily transplantable rat sarcoma‡ were deposited into the cerebellum of 18 rats through a small trephine hole in the occipital bone. Ether anesthesia was used. Ophthalmoscopic examinations were made daily, after it had become apparent from the ataxia and nystagmus that the tumor was beginning to grow. Ten rats developed tumors after 10 to 14 days. Three of the rats with cerebellar tumors died spontaneously. Seven were killed, four by decapitation, and three by injecting 10-percent formalin into the aorta. The fundus was examined by slitlamp, after the anterior portion of the globe had been removed and the lens and the vitreous allowed to escape. The examination by slitlamp was made in order to verify the ophthalmoscopic findings. The rat's cornea frequently exhibits irregularity of contour that renders ophthalmoscopy difficult. Microscopic sections were made through the region of the disc, using 10-percent formalin as a fixative, imbedding in nitrocellulose, and staining with hematoxylin and eosin.

In the same fashion cerebellar tumors were implanted into 21 rats that had been found to have arterial hypertension following the intracisternal injection of kaolin, according to a technique that we have previously described.[2] Of these, eight developed tumors comparable in size with those of the first series. Four of the eight animals died spontaneously; four were killed by injecting 10-percent formalin into the aorta. Examinations by ophthalmoscope and microscope were made as before.

Ophthalmoscopic examinations were made upon 20 rats having arterial hyper-

* From the Robinette Foundation, the Medical Clinic of the Hospital, and the Pepper Laboratory of the University of Pennsylvania. The latter collaborator is Henrietta Heckscher Fellow in Medicine. This work has been facilitated by a grant from the Philadelphia Heart Association.

† From the Department of Ophthalmology, Hospital of the University of Pennsylvania.

‡ Rat sarcoma R-39. Obtained through the courtesy of Dr. Francis Carter Wood, Columbia University, New York.

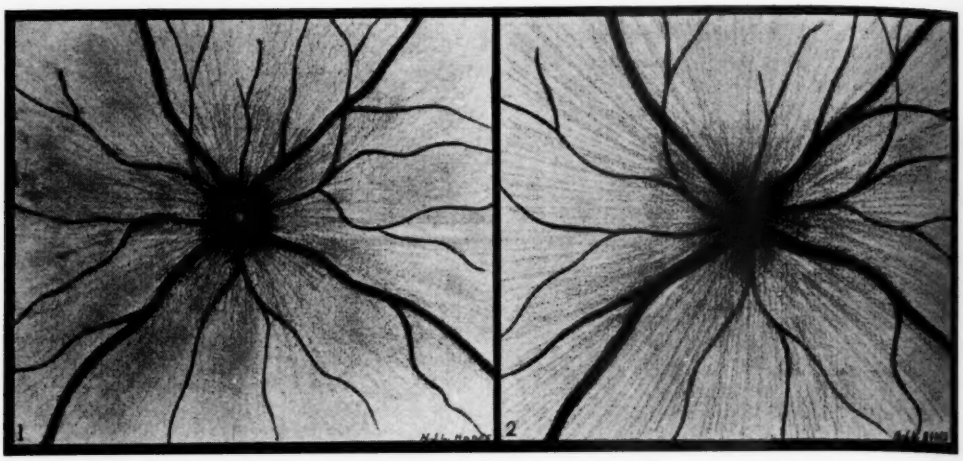

Fig. 1 (Jeffers, Griffith, Fry, and Fewell). Fundus of a normal albino rat.
Fig. 2 (Jeffers, Griffith, Fry, and Fewell). Fundus of an albino rat bearing an actively growing cerebellar tumor. Note the venous engorgement and the appearance of fullness in the region of the disc.

tension following intracisternal injections of kaolin. The eyes of three of these animals were studied histologically.

Results

Our results are summarized in table 1. The eyes of most of the animals bearing cerebellar tumors, when no kaolin had been injected, showed engorgement of the retainal veins as tabulated. In one of three animals there appeared to be edema about the disc. However, when kaolin had been injected into the cisterna magna prior to the implantation of tumor tissue, no engorgement of the retinal veins appeared, nor was there any detectable edema about the disc.

Figure 1 is a drawing of the fundus of a normal albino rat. Note that the disc margins are not clearly discernible. The fundus of an animal that has increased intracranial tension and arterial hypertension following an intracisternal injection of kaolin is in all respects similar to the normal.

Figure 2 is a drawing of the fundus of a rat bearing an actively growing cerebellar tumor. This animal had received no kaolin. Note the engorgement of the retinal veins and the fullness in the region

TABLE 1
Occurrence of changes in the eye

		No. Rats	Ophthalmoscope		Slitlamp		Microscope	
			Exam.	Pos.	Exam.	Pos.	Exam.	Pos.
No Kaolin	C	12	12	0	2	0	2	0
	T	10	10	9	5	2	3	2
Kaolin	C	20	20	0			3	0
	T	8	7	0			3	0

C = without tumor.
T = with tumor.

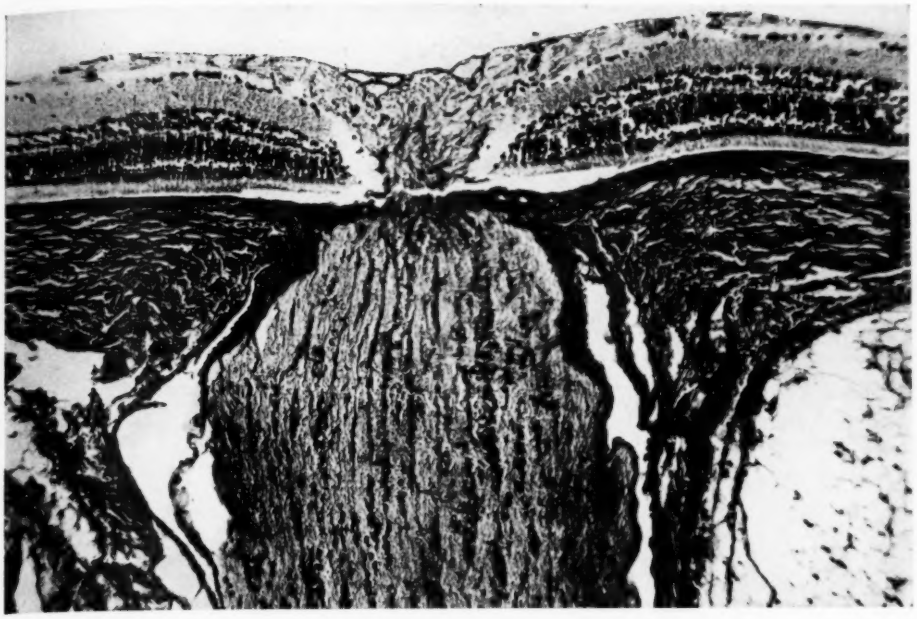

Fig. 3 (Jeffers, Griffith, Fry, and Fewell). Section through the optic disc of a normal albino rat.

Fig. 4 (Jeffers, Griffith, Fry, and Fewell). Section through the disc of an albino rat bearing an actively growing cerebellar tumor. Note the venous engorgement and the edema of the retina about the disc.

Fig. 5 (Jeffers, Griffith, Fry, and Fewell). Section through the disc of an albino rat. Previous hypertension from kaolin. Actively growing cerebellar tumor. Compare with figure 4.

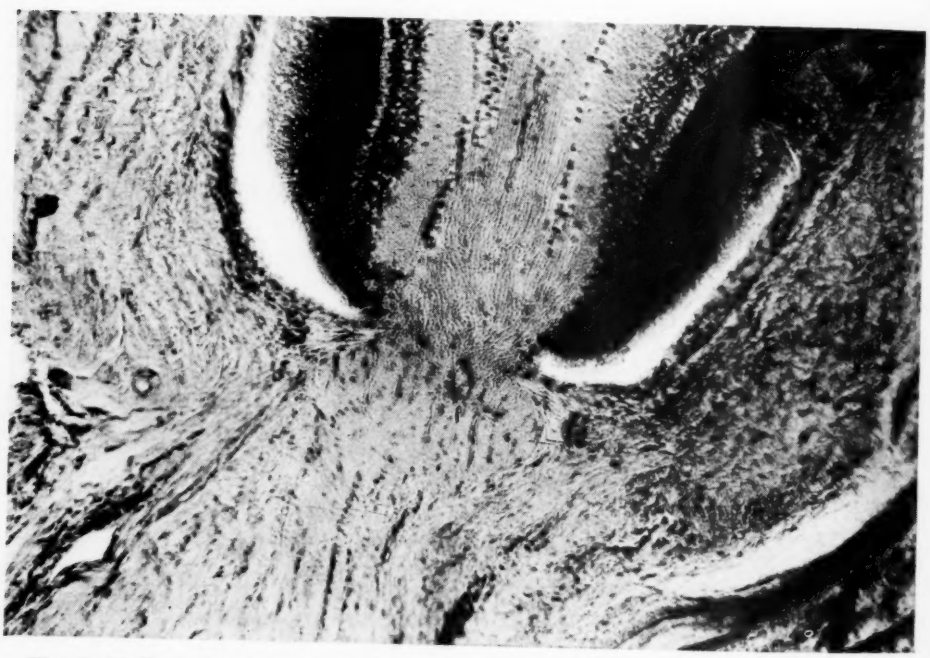

Fig. 6 (Jeffers, Griffith, Fry, and Fewell). Section through the disc of an albino rat. Hypertension following intracisternal injection of kaolin. No tumor. Compare with figures 3 and 5.

of the disc. Microscopically, as shown in figure 4, there is marked venous engorgement, and there appears to be edema of the retina about the disc. The nerve head, however, does not show the characteristic swelling seen in human papilledema.

Figure 3 is a photomicrograph of the optic disc of a normal rat. It is not materially different from figure 6, the same region of an eye removed from an animal that had received kaolin.

Figure 5 is a photomicrograph of the optic disc of an animal bearing an actively growing cerebellar tumor. At the time the tumor was implanted the animal exhibited marked arterial hypertension and increased intracranial pressure due to a previous intracisternal injection of kaolin. No engorgement of the retinal veins is present, and there is no suggestion of edema about the disc.

Discussion

It is recognized that we have not succeeded in producing in the rat a condition that duplicates exactly papilledema in man. There are, however, certain phases that are similar; that is, the venous engorgement and the edema adjacent to the disc. We believe that the changes produced in the rat's eye are analogous to those of human papilledema and that the experimental evidence here presented may have some application to the problem in man.

A brief review of some of the hypotheses proposed to explain choked disc may clarify our position. The nonmechanical, or so-called toxic or inflammatory hypotheses do not seem to be the likely explanation for the signs that we have observed experimentally.

Four possibilities have been described to explain the pathogenesis of choked disc on a mechanical basis:

1. Von Graefe[3] postulated that pressure on the cavernous sinus was responsible for papilledema. This belief was disproved by Sesemann.[4]

2. Deyl,[5] Dupuy-Dutemps,[6] Merz,[7] Fry,[8] Paton and Holmes,[9] Lauber,[10] and Sobanski (quoted by Lauber) all have presented evidence for the following: They believe that cerebrospinal fluid under increased pressure produces an obstruction to venous return by compressing the central vein of the retina where it crosses the intervaginal (subarachnoid) space of the optic sheath. The congestion of the retinal veins is thus explained. The actual edema of the nerve head is presumed to be secondary to the venous stasis.

Our histologic and roentgenologic evidence, previously reported,[1] suggests that the whole subarachoid space may have been occluded by kaolin. Therefore the usual hydrostatic effect of cerebrospinal fluid upon the emerging central vein may have been abolished. From the study of serial sections through the region of the rat's eye, made available through the courtesy of Dr. W. H. F. Addison, it was apparent that the central vein of the retina in the rat, as in man, courses through the intervaginal space for a short distance just after emerging from the disc.

3. Levinsohn[11] and others have proposed that papilledema is due to blockage of the lymphatic outflow from the eye (see below).

4. Bordley and Cushing[12] have presented evidence that papilledema is due to an increased output of cerebrospinal fluid. According to Schmidt,[13] Manz,[14] and Schmidt-Rimpler[15] the edema fluid passes through the lamina cribrosa. Schieck[16] believes that it reaches the disc by way of the perivascular lymph spaces.

We believe that the reason for the failure of the tumor-bearing, kaolin-hypertensive rat to develop abnormalities simulating choked disc must be the block pre-

viously demonstrated[1] in the normal pathways for cerebrospinal fluid between the subarachnoid space and the eye. Cerebrospinal fluid is thus prevented from coursing forward to collect in the region of the disc. The alternative explanation is that the block prevents the hydrostatic pressure of cerebrospinal fluid on the central vein of the retina. If choked disc were caused by interference with the passage of fluid from the eye to the subarachnoid space (that is, in the reverse direction), then the kaolin block not only would fail to prevent the appearance of papilledema but would actually facilitate its formation. Our findings, therefore, seem to support the theories of Schmidt-Rimpler and others.

Summary

1. Rats developing increased intracranial pressure and vascular hypertension following the intracisternal injection of kaolin were found to develop no ocular changes upon ophthalmoscopic or histologic examination.

2. Ten rats developed a condition simulating papilledema upon the implantation of cerebellar tumors, as confirmed by the same examinations.

3. Eight rats that were known to have increased intracranial pressure after the intracisternal injection of kaolin failed to develop signs of papilledema in the presence of large cerebellar tumors.

4. The evidence presented is interpreted as support for the view that papilledema is due to an increased flow of fluid from the cerebrospinal space to the eye, and that it is not due to a block in the flow from the eye toward the cerebrospinal space.

5. Our findings are discussed with reference to hypotheses concerning the nature of papilledema.

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[14] Manz. Arch. f. Ophth., 1870, v. 16, p. 265.
[15] Schmidt-Rimpler. Arch. f. Augenh., 1888, v. 18, p. 152.
[16] Schieck. Arch. f. Ophth., 1924, v. 113, p. 157.

ANISEIKONIA IN EMMETROPIA

WENDELL L. HUGHES, M.D.
Hempstead, Long Island

Since February, 1934, a total of 650 patients have been examined for aniseikonia on the ophthalmo-eikonometer which is now at the New York Eye and Ear Infirmary. Most of these were referred by their ophthalmologists because of symptoms that were apparently ocular in origin and were not relieved by previous measures. Of these patients, 43 had no error of refraction, but were suspected of having some abnormality on account of the relationship of the symptoms to the use of the eyes. Fourteen of these 43 patients had no measurable aniseikonia, while an appreciable asymmetry of the visual images in size and shape was found in 29. In this latter group, despite the bilateral equality or refraction (emmetropia), there existed an asymmetry in the size or shape of the image seen by one eye, as compared to the image seen by the other eye. The patient obtained the iseikonic lenses in 18 of the 23 cases in which they were prescribed. In 14 of these cases in which the patient has been wearing the zero power lenses correcting only the aniseikonia, complete data as to the results were reported. These are tabulated below.

TABLE 1
14 CASES REPORTING RESULTS

Marked relief (complete or nearly so)	10
Moderate relief	1
Slight relief (questionable)	1
No relief	2
	14

Relief of symptoms was reported in 10 cases, partial relief in two cases and no change in symptoms in two cases.

Considering the entire group of 43 emmetropic cases examined, there was no significant etiological factor as far as age or sex was concerned. The youngest of the patients was six and the oldest 47 years of age.

TABLE 2
AGE AND SEX

	Age			Sex	
	Average	Minimum	Maximum	Male	Female
14 patients had no aniseikonia	20.9	6	45	8	6
29 patients had aniseikonia	27.3	9	47	13	16
43 patients (entire group)	25.3	6	47	21	22

TABLE 3
FREQUENCY OF SYMPTOMS

Symptoms	No. of Patients with Symptoms	No. with Aniseikonia	% with Aniseikonia
Headache	25*	17	68
Ocular pain	20	17	85
Ocular fatigue	14	11	78
Photophobia	11	10	91
Reading difficulty	8	3	37
Squint	2	2	Infrequency of these last three
Annoyed by motion	2	2	symptoms makes %
Seeing flat	1	0	inaccurate

* Four of these had migrainous type of headache, of which one had aniseikonia.

The recognition of these cases is always difficult, but the symptoms shown in table 3 which are also presented by aniseikonic patients in general, predominated.

TABLE 4
SYMPTOMS PER PATIENT

Number of Symptoms	Total No. of Pts.	Pts. with Anis.	% with Anis.
1 per patient	20	11	55
2 per patient	12	8	67
3 per patient	6	5	84
4 per patient	4	4	100
5 per patient	1	1	100
	43	29	

One striking feature is that 10 of the 11 patients (91 percent) complaining of photophobia and 17 of the 20 patients (85 percent) with ocular pain had aniseikonia. It is also of note that photophobia did not occur without other accompanying symptoms of aniseikonia in any of these cases. It was present in all but one of the 11 patients having more than two major symptoms.

Most cases of concomitant strabismus in which we have been able to estimate the relative size of the retinal images have shown a large degree of asymmetry. The frequency of this finding would lead us to believe that the aniseikonia might be a factor in the etiology of the condition and explain the difficulty with which fusion is obtained in some of these cases after operation.

Many of the 43 emmetropic patients had a multiplicity of symptoms. It will be seen by reference to table 4 that the more symptoms of which the patient com-

TABLE 5
TYPE OF SYMPTOMS

	14 pts. with No Aniseikonia	29 pts. with Aniseikonia	43 Patients Total
One complaint	9	11	20
Ocular pain	0	4	4
Ocular fatigue	1	0	1
Headache	4	2	6
Reading difficulty	4	3	7
Squint	0	2	2
Two complaints	4	8	12
Ocular pain and headache	2	5	7
Ocular fatigue and reading difficulty	1	0	1
Photophobia and ocular fatigue	0	2	2
Photophobia and headache	0	1	1
Photophobia and sees flat	1	0	1
Three complaints	1	5	6
Ocular pain, fatigue, headache	1	2	3
Ocular pain, headache, photophobia	0	1	1
Ocular fatigue, headache, photophobia	0	1	1
Ocular fatigue, headache, motion	0	1	1
Four complaints	0	4	4
Ocular pain, fatigue, headache, photophobia	0	4	4
Five complaints	0	1	1
Pain, fatigue, motion* headache, photophobia	0	1	1

* Annoyance by moving objects.

plained, the greater the likelihood that he had aniseikonia.

Analysis of these complaints by comparison of the group having aniseikonia (29 cases) with that having no aniseikonia (14 cases) is shown in table 5.

In the 29 cases in which aniseikonia was found, the right image was smaller in 18 cases, the left image in six, and there were five cases of mixed aniseikonia in which the image of one eye was larger in one meridian and the image of the other eye was larger in the opposite meridian (see table 6).

roborative measurements. It is common knowledge that there is frequently a period of discomfort when lenses are changed. The annoying symptoms are very frequently due to aniseikonia and the patient frequently will in some way compensate, with discontinuance of the symptoms. The exact mechanism involved in this adjustment is not known. However, there are many cases of aniseikonia in which symptoms persist for years despite constant wearing of correcting lenses, or in which no refractive correction is required, as in the present series of cases. In this group, as in many other cases in which glasses are required, it cannot be said that if given time the symptoms will disappear, for the symptoms remain until one factor is changed, that factor being the relative size and shape of the ocular images. Usually there is immediate relief on the addition of this correction. In most of the cases in which iseikonic lenses were prescribed there was no change made in the spherical or cylindrical strength, the only change synchronous with the relief of symptoms being the addition of the cor-

TABLE 6

NUMBER OF CASES AND AMOUNT OF ANISEIKONIA IN PERCENTAGE

	Smaller Image Listed			Amount in Percentage		
	R.E.	L.E.	Total	Min.	Aver.	Max.
Overall	9	0	9	0.75	1.43	2.00
Meridional at axis 90°	4	4	8	1.50	2.30	4.00
Meridional at axis 180°	1	1	2	1.50	2.30	4.00
Overall with meridian at axis 90°	4	1	5	0.50⇔0.50	1.17⇔0.90	2.00⇔1.50
Overall with meridional at axis 180°	0	0	0			
R.E. mer. at axis 90° L.E. mer. at axis 180°			2		1.00⇔1.00	
R.E. mer. at axis 180° L.E. mer. at axis 90°			3		0.50⇔0.83	
Total	18	6	29			

DISCUSSION

It has been maintained* that an individual will adapt himself to the condition of aniseikonia and the symptoms will relieve themselves if given sufficient time. The author concerned himself from a theoretical standpoint with the possibility that discomfort symptoms were due to aniseikonia apparently without any cor-

*Jackson, E. Amer. Jour. Ophth., 1937, series 3, v. 20, Jan., no. 1, p. 16.

rection for aniseikonia. In this way it was determined that the size factor was responsible for the symptoms and that its correction resulted in relief.

Conclusion

The relative size of the ocular images of a group of 43 patients having symptoms that were thought to be ocular in origin was determined. In 14 the images were equal. In 29 they were asymmetrical (aniseikonia).

The results in 14 cases in which complete data were obtainable are reported. Relief was obtained in 10 by the wearing of iseikonic zero power lenses designed to correct the aniseikonia present. It has been shown that the presence of aniseikonia is independent of any refractive error.

I am greatly indebted to H. M. Fisher whose indefatigable work and collection of data have made possible the results here published.

Professional Building.

STUDIES ON THE INFECTIVITY OF TRACHOMA

VII. Further observations on filterability of the infectious agent*

L. A. Julianelle, Ph.D., M. C. Morris, Ph.D., and R. W. Harrison, Ph.D.
Saint Louis

The tentative elimination of bacteria in the evolution of trachoma in this laboratory[1] was confirmed in a later study by purifying the infectious agent successfully on a number of occasions through the expedient of testicular passage.[2] Subsequent experiments[3] on propagation of the infectious agent in tissues cultivated under a wide variety of conditions failed consistently to achieve their purpose. The indications have been obvious, therefore, that the infectious agent of trachoma is a virus. Earlier investigations[4, 5] to determine its filterability revealed the difficulty with which it traverses Berkefeld filters, since in only one of 11 experiments with active tissues were such filtrates found to be specifically infectious. In retrospect, however, it seemed that several possibilities, all amenable to experimentation, might explain the frequent failure of the agent to pass through the filters. Adsorption on the filter, reverse potential of the infectious agent, the presence of the infectious agent within or closely adherent to the epithelial cell, which is nonfilterable, and so forth, theoretically, at least, might interfere with the filtration of an otherwise filterable agent. Publications, in the meantime, by Thygeson and his associates suggested that nonfilterability is, in fact, due to the adsorptive properties of kieselguhr and porcelain filters. While in a previous study[6] with Berkefeld and Chamberland filters, they found the infectious agent of trachoma to be nonfilterable, they showed at this time that filtrates of trachomatous tissues permeating collodion membranes were infectious in both baboons[7] and man.[8]

It was desirable, therefore, to subject the question of filterability to restudy with experiments devised to include these suggested possibilities. It was decided, moreover, to conduct filtrations of the same materials under diversified conditions, whenever quantities were sufficient for the purpose. Accordingly, four different varieties of filters were selected:

* From the Oscar Johnson Institute, Washington University School of Medicine, conducted under a grant from the Commonwealth Fund of New York.

Berkefeld V (kieselguhr), Seitz (asbestos), Kramer[9] (plaster of Paris), and Elford[10] (collodion). The results obtained with these filters are recorded in this report.

Methods

Material for study was obtained through the good will and coöperation of Dr. J. E. Smith from patients in the Trachoma Hospital at Rolla, Missouri. Conjunctival scrapings from each patient made during grattage were suspended in 1.5 c.c. of veal infusion broth (pH 7.8) and in a few instances in Tyrode's solution instead. Upon return to the laboratory about three hours later, suspensions from several patients were pooled and ground aseptically in a sterile mortar. In some of the experiments, as will be brought out later, the ground suspension was centrifugated from three to five minutes at about 1500 r.p.m. to sediment the heavier particles. On such occasions, the infectivity of the supernatant was determined for purposes of control. After centrifugation, the supernatant was used for filtration, which was accomplished in a matter of minutes under a pressure of about 20 cm. of Hg. In a few preliminary experiments, filtration was carried out with collodion membranes* alone, and, later, material was filtered directly without centrifugation. In subsequent experiments, whenever the quantity of material was sufficient, filtrations were conducted with all four filters, otherwise with only the Berkefeld V and collodion membrane. The Berkefeld filters were the small type (size 5), and special Seitz filters were improvised by drawing out pyrex test-tubes so that the tapering extremity measured from 3/8 to 1/2 inch above and from 3/16 to 1/4 inch below. An asbestos pad was then broken up, and the fragments were moistened and transferred to the prepared test tube, where they were packed tightly by tamping with the end of a glass rod and by suction. The modified Seitz filter was then attached with a rubber stopper to a side-arm suction tube and sterilized in the autoclave. The layer of asbestos varied in thickness, approximating three-eighths inch. Cultures were made of the filtrates and the integrity of the filters was tested immediately after use with young broth cultures of B. prodigiosus; the plaster-of-Paris filters were controlled by retention of Congo red.

Inoculations were then made in monkeys (M. rhesus) with unfiltered material, supernatant following centrifugation, and the different filtrates. This was accomplished by rubbing over the surface of the everted conjunctiva of one eye a swab soaked with the material under study, and in the other eye, by subconjunctival injection of 0.2 c.c., after first pricking the conjunctiva with the charged needle and instilling a few drops over the traumatized areas. In order to overcome as far as possible the difficulties referable to individual variation in susceptibility of monkeys, an equal number of animals was inoculated with each material and its filtrates.

Experimental

A large number of experiments on filtration were undertaken, but since the original, unfiltered material was frequently noninfectious when tested in monkeys, only those with tissues of demonstrated infectivity will be considered in this report. Thus, 27 experiments were actually performed with tissues from patients, but in only 12 were the original materials capable of inducing specific infection in monkeys. In the first five of the 12 experiments, filtration was studied in a preliminary manner using only collodion membranes, standardized to a verified average pore size of approximately 0.6 μ. The tissues studied were derived

*The filtering apparatus used for collodion membranes was a replica of a model kindly supplied for reproduction by Dr. J. H. Bauer[11] of the Rockefeller Foundation.

from eight patients, seven of whom showed typical inclusion bodies. The results of these experiments revealed in a clear manner that while the unfiltered materials were infectious, as demonstrated in six of 12 monkeys inoculated, filtrates obtained from the tissues as described infected none of 12 monkeys, indicating that the infectious agent had been retained by the membrane.

Upon consideration of these observations, it appeared probable that the difficulty in filtering the infectious agent of trachoma might reside not so much in the variety of the filter employed as in the nature of the tissues to be filtered, a concept which will be developed to a greater extent later in this report. Consequently, it was decided to test the validity of this hypothesis by employing the different filters described above.

The data bearing on filtration of the infectious agent with the different filters have been summarized in table 1. Discarding the experiments in which the unfiltered tissues were noninfectious, it is seen that a total of seven experiments was performed; in four, filtrations were carried out in parallel with all four filters, and in three, since the material was insufficient for more, with only the Berkefeld V and collodion filters. In these experiments, the average pore size of the collodion membranes was slightly over 0.6 μ, except in one instance when the size was deliberately increased and it measured 0.93 μ. In five experiments, the material was centrifugated before filtration, and in each instance the supernatant fluid subsequently used for filtration was still infectious, thus showing that grinding and centrifugation under the condi-

TABLE 1

INFECTIVITY OF DIFFERENT FILTRATES OF ACTIVE TRACHOMATOUS TISSUES

Experiment number	Number of Tissues		Infectivity in M. rhesus of					
	Pooled	With Inclusions	Unfiltered Material	Supernatant	Filtrates			
					Berkefeld V	Elford	Kramer	Seitz
T64	9	6	Positive in 1 of 3	Positive in 1 of 3	Negative in 3	Negative in 3	Negative in 3	Negative in 3
T65	4	3	Positive in 3 of 3	Positive in 1 of 3	Negative in 3	Negative in 3	Negative in 3	Negative in 3
T66	5	1	Positive in 2 of 3	Positive in 2 of 3	Negative in 3	Negative in 3	Negative in 3	Negative in 3
*T67	5	2	Positive in 3 of 3	Positive in 1 of 3	Negative in 3	Negative in 3	Not done	Not done
T70	3	2	Positive in 2 of 4	Positive in 1 of 3	Positive in 1 of 4	Negative in 4	Not done	Not done
T71	3	0	Positive in 2 of 4	x	Negative in 4	Negative in 4	Not done	Not done
T73	10	1	Positive in 1 of 3	x	Positive in 1 of 3	Negative in 3	Negative in 3	Negative in 3

x Indicates that in these experiments the ground tissues were filtered directly without preliminary centrifugation.

* In this experiment B. prodigiosus was cultivated from the Berkefeld V filtrate, and from the Elford filtrate as well, the membrane in this instance intentionally made with a large average pore size (0.93μ).

tions stated above did not alter appreciably the original infectivity. The minor variations in infectivity of unfiltered tissues and supernatant apparent in experiments E65 and T67 may be interpreted in terms of individual variation in susceptibility of the animals, rather than as a loss of infective capacity, just as in an experiment not recorded in this protocol because the original material had no effect on three monkeys, the supernatant was infectious for one of three animals. The variation in susceptibility of different monkeys has been emphasized in earlier communications from this laboratory and therefore it need not be discussed at the present time.

Analysis of the data discloses that tissues were pooled from three to 10 patients for the individual experiments. Inclusion bodies were present in tissues of all the experiments but one, varying in incidence to as high as 75 percent, but attaining an average for all the experiments of 33⅓ percent. Thus, it is seen that the tissues studied were typical of trachoma. In five of the experiments, comprising 26 patients (T64, 65, 66, 67, and 71), the original material was infectious, inducing experimental trachoma in 11 of 16 monkeys inoculated, while the supernatant following centrifugation gave rise to specific infection in five of 12 animals. In the same experiments, on the other hand, filtrates from Berkefeld V, Elford, Kramer, and Seitz filters as observed in four tests, and from Berkefeld V and Elford filters as observed in one, were incapable of inducing experimental trachoma in any of the 48 monkeys studied. That the failure to infect these animals with the filtrates was not referable to a state of exalted resistance to infection was demonstrated later by infecting typically a reasonable proportion with active material. Thus, the conclusion is inevitable that in these experiments the infective capacity of the original tissues was removed in the process of filtration.

In the two remaining experiments, comprising 13 patients (T70 and T73), the original material infected specifically three of seven monkeys, and in the one instance performed, the supernatant fluid resulting from centrifugation infected one of three animals. In both cases, the filtrate, obtained following passage of the ground tissues through Berkefeld filters, proved to be infectious, in one experiment infecting one of four monkeys, and in the other one of three monkeys, and the conjunctival reaction was typical of experimental trachoma. In experiment T70, filtrate of the same material obtained with a collodion membrane had lost the infectivity of the original tissues; and in experiment T73, filtrates from Elford, Kramer, and Seitz filters also failed to retain any measurable infectivity.

It is interesting to note in this connection that in experiment T67, B. prodigiosus was found to pass through the Berkefeld filter, yet the filtrate derived from trachomatous tissues with the same filter was not infectious. In addition, a collodion membrane with an average pore size of 0.93 μ and permeable to B. prodigiosus, also removed the infectivity originally present in the human material.

To summarize: Of 12 experiments performed with human tissues of demonstrated infectivity, five were conducted with Elford filter alone, and in each instance the filtrate was noninfectious; three were carried out with Elford and Berkefeld V filters, and in one the filtrate obtained from the Berkefeld filter only was infectious; and finally, four experiments were done with all four filters, the filtrates in three experiments being inactive, and in the remaining experiment,, again only the Berkefeld filtrate was able to infect monkeys.

Other experiments were also under-

taken with scrapings from the infected conjunctiva of monkeys, and ground rabbit testicle carrying the virus,[2] employing the technique used for the human tissues. Since in each case the filtrates were not infectious, it does not seem necessary to describe the experiments in any detail.

There are several reasons for assuming that trachoma is preëminently an infection of the epithelial cell. If this assumption is correct, it should follow logically that for the most part the infectious agent either is contained within the cell or is attached to its surface. Since the methods employed for filtration remove all tissue cells, it is more than likely that as a consequence the virus if not entirely withheld may be diminished to a point exceeding its range of infectivity. Grinding of the tissues with its partial cellular disruption apparently does not suffice to improve filterability, or considered from a different point of view, to liberate the virus in association with the epithelial cell. The observation made in experiment T67 that filters may permit passage of B. prodigiosus but not the virus of trachoma, suggests the plausibility of the operation of such a factor during filtration, since it is obvious that the virus is not larger than B. prodigiosus.

Several experiments were undertaken, therefore, to test this hypothesis, in which lysis of the epithelial cell was effected by assumedly gentle means prior to filtration. Thus, in three experiments, with tissues of verified infectivity, alternate freezing and thawing was carried out. The tissues contained in small test tubes were immersed in CO_2 ice-alcohol mixtures (—15°C.) until frozen solidly, which required only several minutes. Then the frozen material was transferred to a water bath regulated to +8°C. to +10°C. for thawing, which was also accomplished in several minutes. This alternate process was continued until stained preparations of the tissues indicated maximum or complete lysis of the tissue cells had occurred, usually accomplished after 12 to 16 freezings. The extract was then filtered in the usual way and the filtrates were inoculated in monkeys. The method proved to be of little value, however, since alternate freezing and thawing as described caused complete inactivation of the virus.

In three other experiments, infectious tissues were exposed to ox-bile in an ultimate concentration of 25 to 30 percent. Following incubation at 37°C. for about 15 minutes, complete lysis had taken place and filtration was attempted. In this instance, also, it was found that bile inactivated the infectious agent. So, also, lysis with dilute alkali failed to serve the purpose of the experiment, because it, too, destroyed the virus. Since, therefore, the tissues lost their infectivity during the manipulation in question, it has not been possible either to achieve filtration more frequently or to appraise the hypothesis stated above.

Discussion

The experiments performed in a previous study on filterability in this laboratory indicated that in one of 11 trials with active tissues, the infectious agent of trachoma was able to pass through Berkefeld V filters. In the present study, the investigation was extended to include several variables which might account for the difficulty of filtration, and consequently four different varieties of filters were employed for the same tissues. The evidence reveals again that filtration is actually an infrequent accomplishment, and in addition, whatever the reasons may be, the inherent difficulties appear attributable to variations in the tissues themselves as well as to the composition of the filter. Not desiring to emphasize the observation, since some undisclosed factor may be responsible, filtration through collodion membranes did not improve filterability *per se*.

In the majority of the communications on filtration, too few experiments have been done by each investigator to warrant the opinion that the infectious agent of trachoma is readily filterable. Thus, Bertarelli and Cechetto,[12] who first reported successful filtration, made a single experiment; Nicolle, Cuénod, and Blaizot[13] made two experiments, both successful. Somewhat later, Olitsky, Knutti, and Tyler[14] demonstrated filterability in one of six trials, and we in this laboratory in one of 11 experiments. On the other hand, an imposing number of experiments by 10 different groups of workers[15] were unable to effect filtration of the infectious agent of trachoma. No particular mention is made in this connection of the work done by Marongiu,[16] who reported filterability through Berkefeld filters, since the evidence is unconvincing, resting as it does on the transmission of infection to the cornea of rabbits, animals uniformly found resistant to trachoma. All these studies, however, were undertaken with the candle type of filter whose adsorptive capacity is well recognized. More recently, Thygeson and Proctor[7] restudied filtration and used collodion membranes for the purpose. In each of four attempts, they showed that such filtrates were actively infectious in baboons. Subsequently with Richards,[8] they were able to repeat this observation in a conclusive experiment by transmitting trachoma to a human volunteer. Cattaneo[17] also employed collodion among other filters without demonstrating filterability, and Stewart in two communications also recorded nonfilterability. In the first study, two experiments were made with collodion membranes,[18] and in the second, five similar experiments were conducted.[19] In one of the later five experiments, however, infection was induced in a grivet, but Stewart considered this as possible spontaneous folliculosis, although judging entirely from text, which may be unfair, it would seem that the infection was actually experimental trachoma. This summary review in conjunction with the studies reported in this communication indicates that the infectious agent of trachoma is filterable, but not readily, and under conditions still not understood.

In attempting to explain the apparent inconsistencies in the publications of different workers, it seems possible on reflection that successful filtration depends upon the quantity of free or unattached virus, or, in other words, upon the degree of epithelial-cell degeneration. When cellular disintegration is slight, it is not unlikely that liberated virus is present in quantities insufficient for successful filtration. When, on the other hand, cellular degeneration is marked or the disease is in an early enough stage to contain free virus because of as yet incomplete invasion of the epithelial cell, the infectious agent is more readily filterable, thus contributing the less common examples reported in the literature. In inclusion blennorrhea, universally considered to be related to trachoma, filtration has been reported with greater regularity. In this condition, excoriation and disintegration of the epithelial cell is commonly present, and there is reason to believe that the infectious agent occurs frequently extracellularly. While it is realized that the two factors are not necessarily related in inclusion blennorrhea, and that this is argument by analogy, nevertheless the concept offers entertaining possibilities.

However, experiments were undertaken to test this hypothesis. Since grinding with its partial cellular disruption failed to increase the filterability of the infectious agent of trachoma, attempts were made to lyze the epithelial cell by chemical and physical means. Unfortunately, the methods selected inhibited the virus, so that no information was gained. Consequently, with experimental evidence lacking, the explanation offered remains

speculation. Yet, when it is possible to observe passage of B. prodigiosus through a Berkefeld filter and a collodion membrane of an average pore size of 0.93 μ, both of which filters retained the virus of trachoma, as seen in experiment T67, then the speculation appears plausible and probable. In any case, the infectious agent of trachoma is filterable, but due to conditions still to be determined, its frequency of filterability is low. Unless experiments in filtration are pursued on a more or less statistical basis, as attempted in the present study, this conclusion is bound to escape the notice of the investigator.

Summary and Conclusions

1. Further studies have been made on the filterability of the infectious agent of trachoma, employing Berkefeld (kieselguhr), Elford (collodion), Kramer (plaster of Paris), and Seitz (asbestos) filters.

2. In all of five experiments on filtration of infectious tissues through Elford filters alone, the filtrates were noninfectious.

3. In seven additional experiments with active material, parallel filtrations with all four filters yielded on two occasions filtrates which were infectious, both resulting from Berkefeld V filtrates only.

4. Filterability has been demonstrated, therefore, in two of 12 trials, as compared with one of 11 trials in a former study.

5. The evidence indicates that the infectious agent of trachoma is irregularly filterable, and that the difficulties in filtration may be attributable to variations in the infectious tissues themselves, as well as in the composition of the filter employed.

6. The possible factors involved in unsuccessful filtration are discussed and a hypothetical explanation is offered.

640 South Kingshighway.

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THE USE OF MUCOUS MEMBRANE IN OPHTHALMIC SURGERY*

EDMUND B. SPAETH, M.D.
Philadelphia

Mucous-membrane grafts have a very definite place in ophthalmic surgery, and when their use is indicated they are most conveniently taken from the buccal mucosa of the mouth. While they can never be of any great size, the amount needed is, also, never extensive. After being lifted they must be cleaned of all adherent submucous fat and lymphatic tissues with sharp scissors. There is but one defect for which these grafts may be used; namely, for the correction of a conjunctival defect, and that in the presence of an intact and healthy eyeball. The best example, a posterior symblepharon of any degree, is readily corrected with this form of graft. Other cases of conjunctival deficiency are just as well suited to this form of treatment. Recently, a case in which a pterygium had been operated upon three times, twice by McReynolds's transplants following an initial resection, was easily corrected with a mucous-membrane graft. Due to a loss of the conjunctiva, the eyeball was, for all purposes, fixed in a state of symblepharon. Diplopia was almost constant because of the fixation of the eyeball to the palpebral conjunctiva.

The lower palpebral conjunctiva may be replaced in part, at times, with skin, but never the bulbar conjunctiva and the conjunctiva of the upper lid. Frequently opinion is to the contrary, but skin always remains skin, and when grafted upon the globe of the eye it continues to be physiologically the same as is the skin on any other part of the body. Rather recently, the author had to recommend the removal of an entire reconstructed upper lid, which had been painstakingly prepared and lined with epithelium by a capable general surgeon, because the cornea was seriously endangered by multiple ulcerations. The superficial layers of skin are lifted by the growth of the underlying structures and are not removed by the usual friction from clothes, and by bathing. As a result, these layers pile up upon the surface of a graft on the globe and cause a most uncomfortable conjunctivitis and serious keratitis, unless they are removed frequently by the friction of a small, damp, cotton-wound applicator. Closure of the lids over the ocular globe does not furnish sufficient friction to remove these normal desquamations, but does cause sufficient abrasion to develop irritation, vascularization of the cornea, and subsequent pannus formation. This complication does not arise in utilizing a mucous-membrane graft.

The grafts lend themselves beautifully to the reconstructive surgery of trachomatous deformities. The mucous membrane does not become subsequently infected by trachoma, perhaps because it contains no lymph follicles, and quite extensive cul-de-sac repairs are possible through its use. Superior cul-de-sac repairs are rather uncommonly necessary, but the grafts are ideal for the inferior cul-de-sac deformities of ectropion and especially of entropion.

TECHNIQUES

The intact conjunctiva is first released by incision and undermined, so that it will move into a position without tension and, therefore, without limiting the normal

*From the Graduate School of Medicine, Peter Clinic, University of Pennsylvania, Philadelphia; and from Wills Hospital, Philadelphia. Read before the New England Ophthalmological Society, Boston, Mass., January 12, 1937.

Fig. 1 (Spaeth). Posterior symblepharon from an alkali burn.

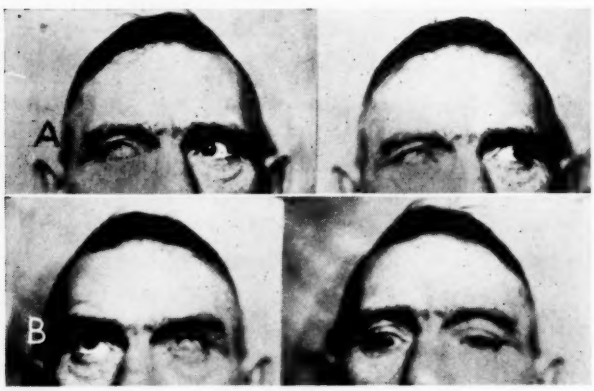
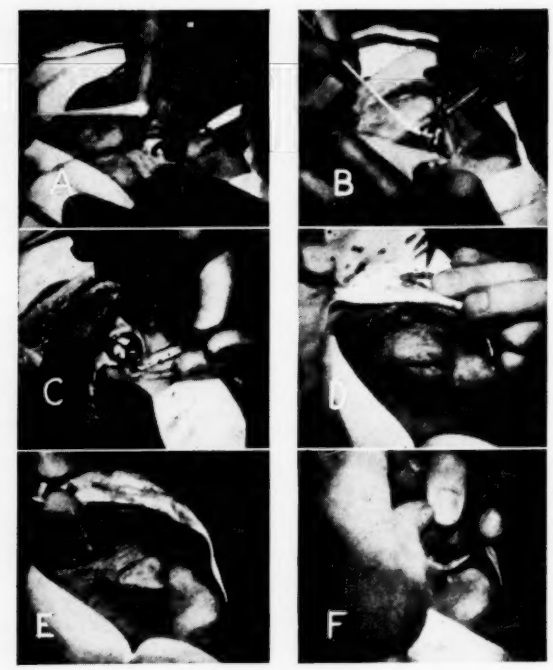


Fig. 2 (Spaeth). Postoperative movement possible. (B was printed from the reversed negative.)



movements of the eyeball. All cicatricial tissue must be cleanly and thoroughly resected. Distorted tarsal plates should be straightened by through-and-through incisions. The defect which results is accurately matched with a model cut from oiled silk. One needs to allow but little, if any, for shrinkage in the mucous-membrane graft. The pattern is then placed upon the buccal mucous membrane within the cheek, and a graft cut from the mucous membrane, matching this pattern accurately in size and in shape. The duct to the parotid gland must not be damaged. At the time of its removal the graft should be kept as thin as is convenient, but this is of no great concern because it must be trimmed subsequently. As soon as the graft is removed, hemostasis is completed in the buccal wound, the incision line is carefully closed with fine dermal sutures, and the wound painted with a 5-percent solution of mercurochrome. The mucous-membrane graft is then placed upon a moistened towel, epithelial surface in contact with the towel, and with a sharp pair of curved scissors the posterior surface is carefully trimmed until all tissue has been removed except the thin, rather slimy, mucous-membrane layer. It can also be pegged out taut, mucous-membrane surface downward, upon a tongue blade, and thinned down in this position. When it is in proper condition one is agree-

Fig. 3 (Spaeth). A, Resection of the symblepharon. B, Incision of the inferior cul-de-sac. C, Fitting the glass conformer. D, Trimming the graft. E, Placing the graft over the palpebral fissure. F, Conformer and graft in the cul-de-sac. Smoothing the edges of the graft over the edge of the lower lid.

ably pleased by the ease with which it can be worked. The graft is utilized from now on under varying procedures depending upon the correction necessary.

These different methods will be detailed later. One typical case is mentioned immediately to illustrate the basic principles. It is the satisfactory *correction of a completely lost inferior cul-de-sac*. Figure 1 illustrates the condition before correction; figure 2A, after correction, with the patient looking up to show the very satisfactory graft obtained; B with the patient looking to the side to show the absence of any limitation in ocular motility (this to be compared with the very evident cicatricial fixation of the eyeball seen in A); and when looking straight to the front. Figure 3A and B show the incision of the symplepharon and of the inferior cul-de-sac; C, the fitting of a glass conformer into the dissected cul-de-sac; D, the mucous-membrane graft lying upon a towel, its posterior surface being trimmed; E, the mucous-membrane graft has been placed smoothly and evenly over the palpebral fissure, epithelial surface outermost, so that when the palpebral fissure beneath it is opened the mucous-membrane graft can be moved into the dissected cul-de-sac prepared for it by the glass or metal conformer; and, in F, the edges of the graft are being smoothed out evenly on the lid margin prior to the closure of the lids and the application of a pressure dressing. The pressure bandage is necessary, in that both eyes must be kept closed and immobile. After healing, a 5- to 10-percent contraction of the mucous-membrane graft is all that will and should occur, if infection does not develop. Sutures are not necessary in this technique except for temporary intermarginal su-

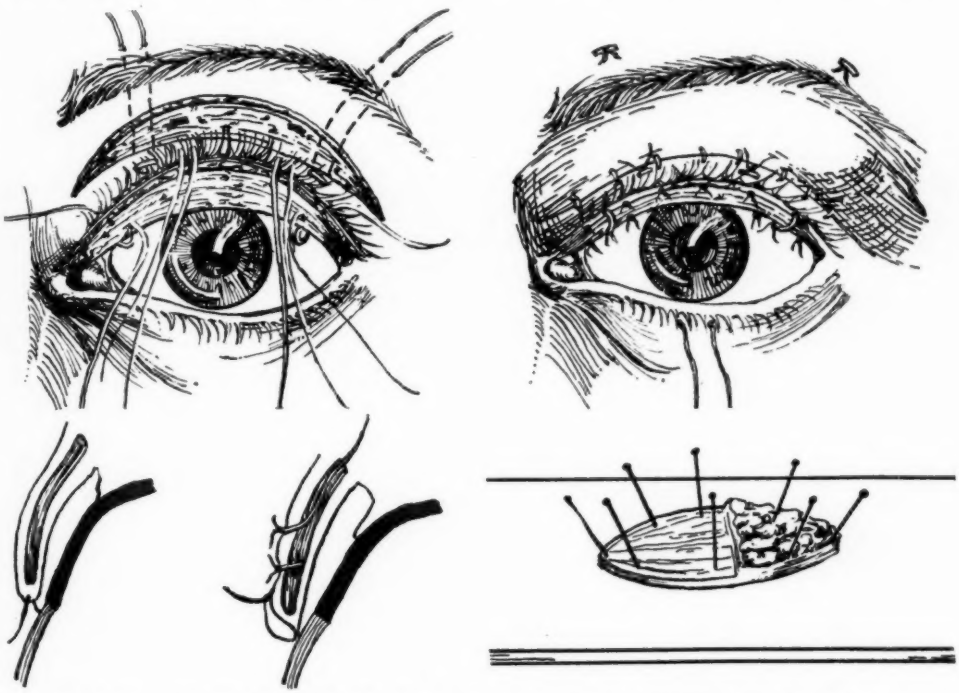


Fig. 4 (Spaeth). Details in the VanMilligen technique for the correction of trichiasis.

tures to keep the lids closed and quiet. The healing is usually very prompt. The intermarginal sutures may be removed at the end of four days, the conformer removed, cleansed, and replaced, and the lids again closed for four additional days, with a lighter second pressure dressing. After the removal of the tarsorrhaphy sutures, careful irrigation with warm boric-acid solution will cleanse the cul-de-sac of all accumulated secretions. This same irrigation should be continued several times daily for a week to 10 days, at which time the case may be discharged from the hospital. In general, this is the technique for the correction of conjunctival defects wherein the inferior conjunctival cul-de-sac needs reconstruction and reformation.

Mucous membrane, in its application to the upper lid, has its greatest value in the *correction of trichiasis and of entropion,* especially that which forms during the cicatricial stage of trachoma. The correction of lid colobomata caused by the necessary removal of a large portion of the upper lid because of malignancy is another deformity not rarely seen.

In the first of these, a slight modification of Van Milligen's original technique is very satisfactory (fig. 4). The margin of the eyelid is incised immediately posterior to the line of the lashes, and parallel to the margin, for its entire length. The skin of the eyelid is then elevated to the orbitopalpebral fold, carrying with it the line of lashes. A crescentic-shaped portion may be resected from the orbitopalpebral fold, if desired, though it is not usually essential. It is perhaps wiser to do this if the skin appears to be redundant. Two double-armed sutures are passed through the skin of the lid margin, from the central points of the outer and the inner thirds, slightly anterior to the line of lashes, and these are then passed subcutaneously beneath the eyebrow to the skin of the forehead above the eyebrow, quite as one would pass sutures for a Hess ptosis operation. Between these two sutures and very close to them, a second pair of double-armed sutures is passed *downwards* from the two extremes of the middle third of the lid surface, arising from the lower portion of the fascia over the tarsal plate, and emerging on the skin surface just anterior to the line of lashes and very close to the position of the first two sutures just described.

These four sutures, when tied, have important functions. The latter two of the four anchor the lid margin, with the lashes (which formerly were in trichiasis), upward and away from the conjunctival surface. At the same time when tied (and these are tied first) they give a firm support for the first of the two pair of sutures which are now tied (secondly) and which should correct the moderate degree of ptosis almost universally present in these cases. The incision, or the site of the resection, in the orbitopalpebral fold is then closed with interrupted black-silk sutures. The silk for these four sutures should be a waxed, number 1, twisted black silk. The mucous-membrane graft is then cut from the buccal mucosa, trimmed to a proper thinness, and then cut to an exact pattern of the defect which must be filled in. This defect lies between the line of the lashes above and the free cut edge of the conjunctiva of the upper lid below. Twisted, waxed, black-silk sutures are used to hold this in position. If two fine sutures are first placed from the skin edge to the conjunctival edge, one at the middle point of the outer third and one at the middle point of the inner third of the lid margin, the mucous-membrane graft can be slipped between the loops of these and by tying them lightly, the graft will be held in place accurately. Additional sutures, as are necessary, can be placed without

difficulty. These two looped sutures enable one to tuck the edge of the mucous-membrane graft close to the edge of the skin surface so that absolute approximation is obtained. One must be certain that fine black-silk sutures anchor the two extremities of this graft into the apices of the lid-margin incision at the inner and the outer canthal angles. The punctum should remain attached to the lid margin. Figure 4 illustrates the sutures and a sketch of the completed result, also the sketch of the cross surface of the lid illustrating the position of the sutures and of the mucous-membrane graft at the lid margin. The operation is to be completed with a suture in the lower-lid margin, as advised by Frost, so that when the dressing is applied the lower lid can be brought up across the cornea, protecting this from any damage that might occur because of the moderate pressure which must be applied with the postoperative dressing.

Fig. 5 (Spaeth). Trachomatous ptosis and trichiasis before and after correction.

This dressing consists of a piece of oiled silk overlying the palpebral fissure; immediately thereon, a finely grained, dry sea sponge is placed, and the hollow spaces about it and over it filled in with tufts of dry, absorbent cotton. A gauze fluff is placed upon this, and if both eyes are corrected simultaneously, a figure-of-8 bandage should be applied binocularly. In correcting both eyes simultaneously one must be certain that the amount of mucous membrane that has been resected is adequate for the two lids.

Figure 5 (A) shows a bilateral trachomatous ptosis and entropion before this form of surgery, and (B), after the correction. Attention is called to the reformation of the orbitopalpebral fold,

Fig. 6 (Spaeth). Traumatic trichiasis, left upper lid, after correction.

and to the lack of discomfort in the patient's face as seen when comparing (A) with (B).

One of the best results obtained through the utilization of this technique was in an instance of *traumatic entropion* seen in a three-months-old child. The condition was bilateral and resulted from the accidental instillation of a 10-percent solution of silver nitrate (instead of a 1-percent solution) at the birth of the child. The edges of the upper lid were rolled inward for the outer two thirds of the lid margin. The superior conjunctival cul-de-sacs were shortened, contracted, and the left was infiltrated with a dense cicatrix. The superior tarsal plates seemed to be healthy. Each cornea showed diffuse superficial scarring, although it was impossible to state whether this was due to the original trauma or was subsequent to and the result of the trichiasis. A Ziegler cautery-puncture operation for entropion was successful in the right eye only. A mucous-membrane graft was carried out on the left upper

lid according to the technique just outlined, with complete success. This result has now remained over a period of several years and there is no reason to believe that it will change. Figure 6 illustrates the patient at this time. The position of the lashes can be rather easily seen.

was removed. The conjunctival cul-de-sac of the lower lid is sufficient to permit this extensive mobilization. The defect in the skin surface caused by the elevation of the lid is filled in with a razor-cut epidermal, free-skin graft. After healing has occurred from this first-stage operation, a hair-bearing epithelial graft from the

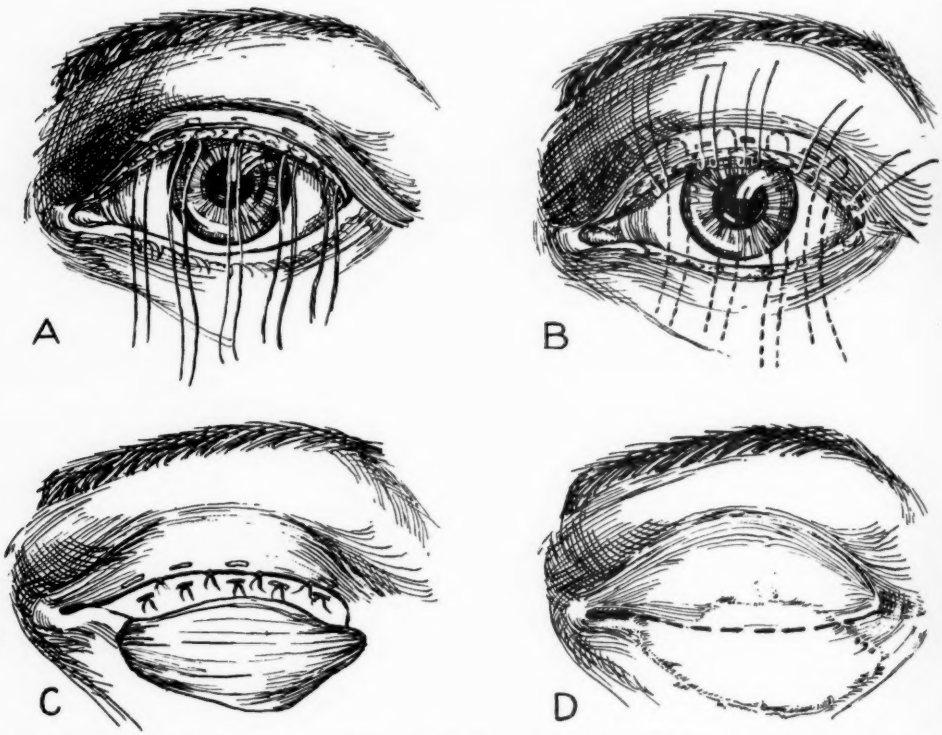


Fig. 7 (Spaeth). Details in Axenfeld's utilization of the lower lid for the reconstruction of the upper lid.

When it is necessary to remove an entire upper lid the subsequent *re-formation of the upper lid* can be carried out according to the technique first outlined by Axenfeld and more recently presented, in a beautiful manner, by Wendell Hughes. This consists in the elevation of the whole lower lid after a resection of the entire length of the lid margin. An incision in the skin of the lid permits this elevation, and makes possible the suturing of the lower-lid margin into the cut edge or ledge of this from which the upper lid

upper lid on the other side may be transplanted to the site for the new palpebral fissure. The new palpebral fissure is formed by a horizontal incision through this fold of epithelium and of conjunctiva, the position of the hair-bearing graft indicating the level of the upper lid. The tarsal plate of the lower lid, wholly, or in part, now lies in the newly formed upper lid. It may be necessary to transplant a piece of cartilage from the concha of the ear into the lower lid to maintain a satisfactory shape. If so, this is to be done

later. Axenfeld simulated the position of the lashes upon the new lid margin by tattooing. Figure 7, A, B, C, and D are sketches to explain and illustrate further this technique. At the time the new palpebral fissure is formed one must be accurate in approximating the conjunctiva to the skin surface by sufficient fine black-silk sutures so that a smooth lid margin may be formed. The inferior punctum should be spared.

Lesser defects of either the upper or the lower lid are corrected somewhat differently. Figure 8 illustrates a case of a *lid coloboma* six months after the resection of a squamous-cell epithelioma. The resection included the entire thickness of the upper lid and was followed by a satisfactory and apparently proper amount of radium therapy. The drawing does not illustrate adequately the amount of scar tissue present. To start the plastic correction, a pocket should be formed upon the skin of the face. This pocket, which is lined with mucous membrane from the mouth (see figure 8 A), should be slightly greater in size than is the defect in the lid. Moreover, the place where the mucous-membrane pocket is to be formed must be carefully selected, so that when the outer wall of this pocket is moved up, subsequently, as a pedicle flap (epithelial surface outermost, mucous-membrane surface innermost) it will fit into a correcting position without undue tension upon the pedicle. As soon as the position for the pocket has been determined, the skin is incised and undermined sufficiently

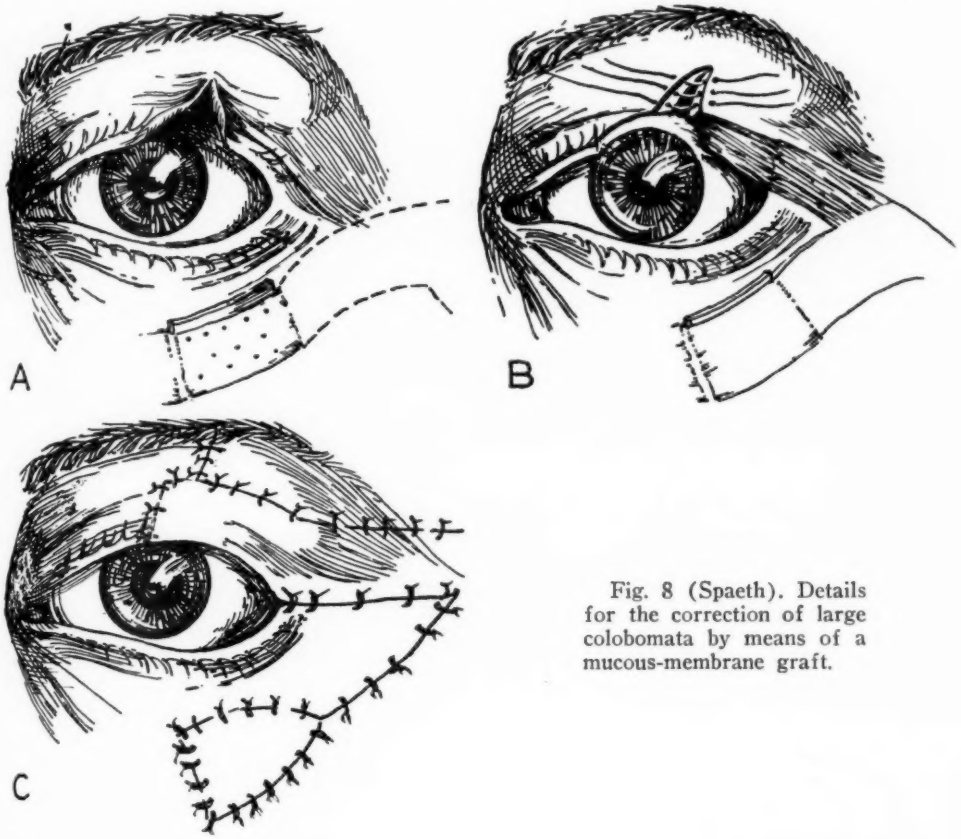


Fig. 8 (Spaeth). Details for the correction of large colobomata by means of a mucous-membrane graft.

to form a recess in which the mucous membrane is to be placed. This is cut, thinned out accurately, and wrapped about a thin flat plate of dental stent or over a flat silver plate. The shape of these plates should approximate the shape and the size of the defect, although they must be slightly larger, over all, than is the defect itself. Postoperatively this, the first-stage operation, is handled as is any other epithelial inlay. After an interval of two or three weeks the second stage (see fig. 8B), is carried out. The edges of the coloboma are resected cleanly and smoothly either as a rectangular or as a roughly triangular defect, and the apex of this on the tarsal-conjunctival surface closed with sutures (fig. 8B). The external wall of the mucous-membrane pocket is then incised about its three edges and detached so that it will form the correcting head of a pedicle flap (fig. 8C). The pedicle of the flap itself is next cut so that it can be moved into the defect in the lid. It may be necessary to resect, but not to discard, some healthy skin which will lie in the path of or at the position chosen for the pedicle of the flap. If so, this skin is to

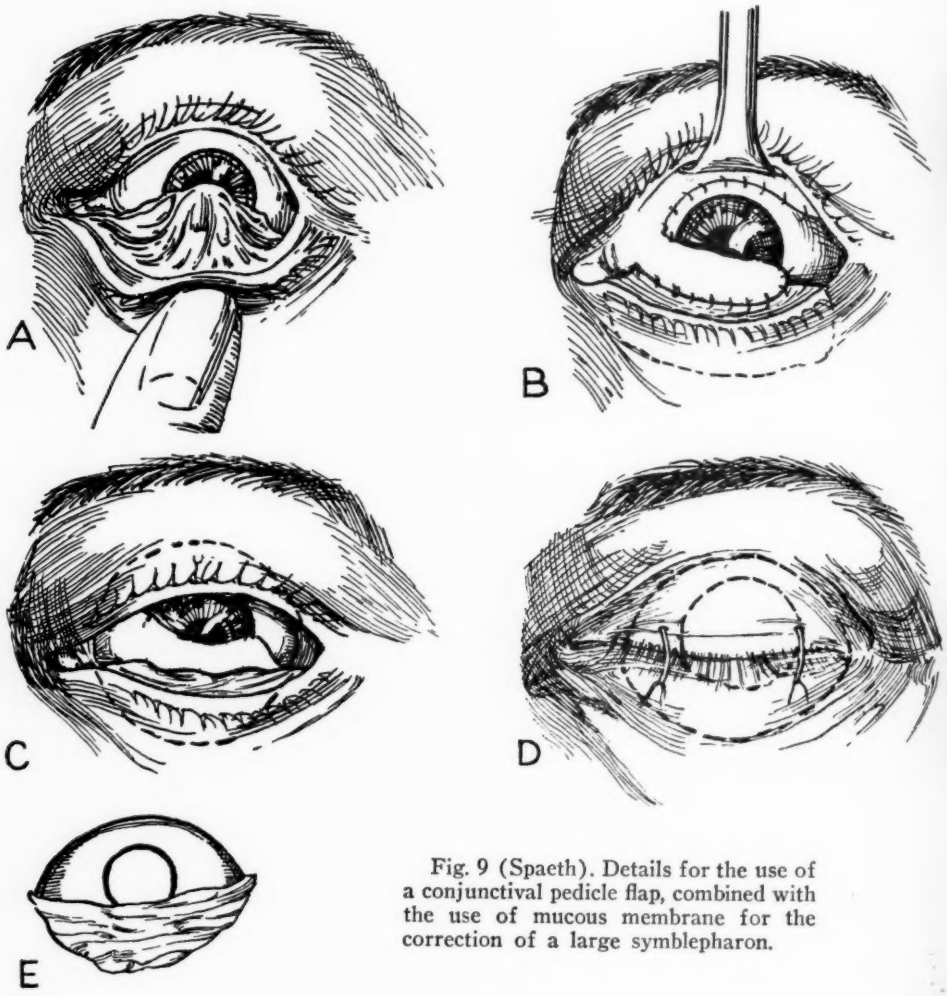


Fig. 9 (Spaeth). Details for the use of a conjunctival pedicle flap, combined with the use of mucous membrane for the correction of a large symblepharon.

be placed in warm physiological salt solution, for it will be needed later in the operation. The mucous-membrane surface of the pedicle flap is then sutured to the conjunctival surface at the edges of the coloboma with buried six-0 catgut sutures.

Fig. 10 (Spaeth). Same case as in figure 9, after correction.

The skin surfaces may be closed throughout with fine black-silk sutures. The mucous membrane which formed the posterior wall of the pocket on the face must be removed and discarded, for it would be quite conspicuous if it were permitted to remain there. The defect formed by its removal can be easily covered with the skin which was removed from the upper lid to permit the application of the pedicle flap. If none is available, a razor-cut epidermal graft must be used to cover the defect. A dressing, exerting a moderate degree of pressure, is necessary.

Wheeler's halving operation is ordinarily satisfactory for the major number of *congenital colobomata.* If, however, one should present itself too great in size for his technique, or complicated by other conjunctival defects, such as congenital dermoid cysts of the conjunctiva, then the same technique as outlined for this operative colobomata may be applied for the correction of the congenital deformities. Traumatic colobomata which involve the conjunctival surface of the upper lid to such a degree that closure of the continguous edges is impossible may be corrected by this method as well.

Thick and tough *cicatrices* in the inferior cul-de-sac, especially when they encroach upon the cornea to a great extent, can be corrected by combining a pedicle flap of conjunctiva from above the limbus with a mucous-membrane graft over a glass or metal conformer into the inferior cul-de-sac reopened by sharp dissection. A pedicle flap is first cut from the bulbar conjunctiva above the limbus and

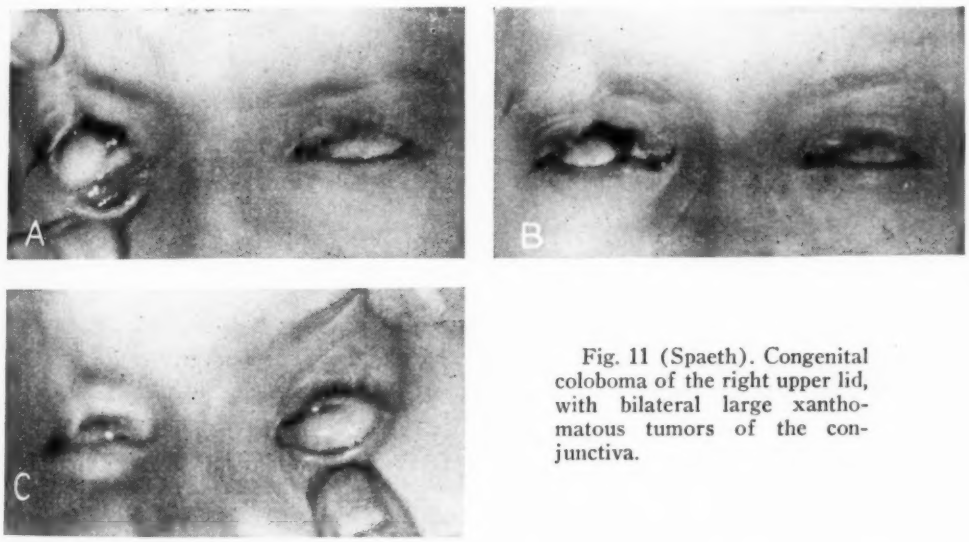


Fig. 11 (Spaeth). Congenital coloboma of the right upper lid, with bilateral large xanthomatous tumors of the conjunctiva.

moved downward across the denuded surface of the cornea and the juxtacorneal sclera. This is sutured into position with fine black-silk sutures and the cul-de-sac itself then reconstructed according to the technique already described. Practically, it has been demonstrated that in these symblepharon corrections a denuded portion of the cornea will not become epithelialized by an extension of the intact, remaining corneal epithelium. The initial destruction of the cornea has been so extensive and has penetrated so deeply that a large portion of substantia propria may have been destroyed. Because of this the damaged cornea must be covered either with the conjunctival flap or with the mucous membrane. The cosmetic effect obtained will be less conspicuous, and healing will be satisfactory and uneventful. Thick, fleshy, pseudo-pterygium-like masses develop in instances in which attention is not paid to this point. Figure 9 illustrates the technique for combining a conjunctival flap with a mucous-membrane graft. The sketch illustrates the degree of involvement, the position of the conjunctival pedicle flap, and the graft about a conformer and shows, as well, the conformer in place in the lower cul-de-sac. Figure 10 is the end result in such an instance. This patient retains 6/15 vision in the eye. Figure 11 A, B, and C are the illustrations of a case of a congenital coloboma of the right upper lid, with large bilateral, congenital xanthomatous tumors of the conjunctiva. These extended into the inferior cul-de-sacs and covered for a considerable distance, one upon the right and one upon the left, each cornea. The conjunctival defects, following the resection of the tumor masses, were covered in part with conjunctival pedicle flaps as described from the superior fornices, and the inferior cul-de-sacs were re-formed by mucous membrane. The coloboma of the upper lid was corrected to the degree shown by a Wheeler halving operation.

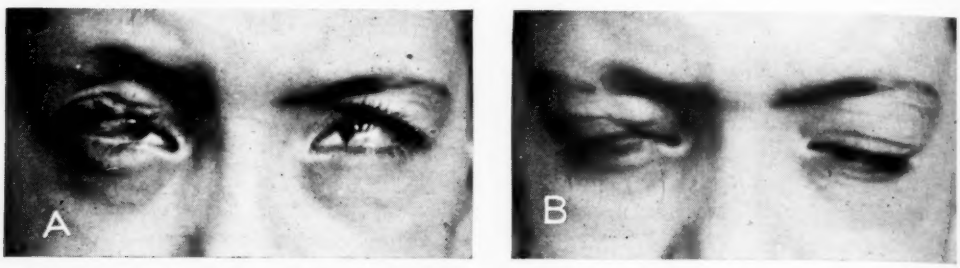


Fig. 12 (Spaeth). Same case as in figure 11, after correction.

Fig. 13 (Spaeth). Essential shrinkage of the conjunctiva. The case after reconstruction of the inferior cul-de-sac.

Figure 12 shows well the position of the grafts and the edges of the conjunctival flaps.

Essential shrinkage of the conjunctiva, also known as pemphigus, can be corrected only by a mucous-membrane graft. The surgery must be done, if possible, before the case has progressed to a complete symblepharon with a dry, scaly cornea and with hardened and contracted cul-de-sacs. Fortunately, in the major number of instances, the pathology seems to start in the inferior cul-de-sac. The surgery is the same as that carried out for the restoration of a cul-de-sac with extensive symblepharon. The lid margin is incised posterior to the line of lashes, the cul-de-sac opened, and all of the diseased palpebral and bulbar conjunctiva cleanly resected. A mucous-membrane graft is then cut to size, trimmed, and fitted to the palpebral and bulbar defects as outlined before. The corneal epithelium does not share so extensively in the pathology as do the bulbar and palpebral conjunctivae proper. It is, therefore, possible to conserve much or most of this and maintain some fair visual acuity thereafter. Figure 13 illustrates the very satisfactory inferior cul-de-sac obtained in such a case. In A the eyeballs are strongly elevated and the inferior cul-de-sac is depressed; B shows the patient with both eyes open and looking straight to the front.

The *complete destruction of both* the *upper and* the *lower cul-de-sacs* from acid or from a caustic usually must be followed by an enucleation and by a subsequent plastic correction of the socket. If the eyeball has not been perforated, however, it is quite possible to dissect the lids free from the surface of the globe, to remove all of the cicatrix, and to replace the entire conjunctival surface with a mucous-membrane graft. As a result of this, in three instances the patients have maintained a good light perception, and in one instance the ability to detect hand movements is present with a gross color perception when colored lights are used. The white appearance of the eyeball is, in truth, not especially pleasing, but the patient guards the vision retained most jealously. The procedure certainly should be recommended when one remaining eyeball is involved. Another point worth considering is this, that perhaps, in the future, some satisfactory form of keratoplasty may be developed to return an even greater degree of light perception to such individuals.

Conclusion

In general, while mucous-membrane grafts have a limited application, these indications are very definite, and, if they are considered carefully, the results obtained should be satisfactory.

The technique for operating is not difficult; every operating opthalmologist is capable of the surgery; and most important of all, there is no other method available (nor is another necessary) for correcting the defects and the deformities for which the surgery is applicable.

1930 Chestnut Street.

HYPERTENSIVE MENINGEAL HYDROPS*

A SYNDROME FREQUENTLY FOLLOWING INFECTION IN THE MIDDLE EAR OR ELSEWHERE IN THE BODY

LEO M. DAVIDOFF, M.D. AND CORNELIUS G. DYKE, M.D.
New York

In a period of six years (1929-1935) at the Neurological Institute, out of a considerable number of related conditions, a group of cases was gradually isolated that presented a uniform clinical and encephalographic syndrome. This consisted of signs of increased intracranial pressure; that is, increased spinal-fluid pressure, headache, and papilledema, but seldom vomiting. Abnormal neurological signs were absent or minimal; the cerebrospinal fluid was clear, colorless, and cytologically and chemically normal in the majority of cases. Encephalograms revealed the ventricular system to be normal, or, if anything, smaller than normal in size and not unusual in shape and position.

It is the purpose of the present communication to crystallize the conception of this condition, to present some aids in diagnosis, and to suggest modes of therapy that have proved successful in the majority of the cases in this series.

LITERATURE

There are no contributions in the literature confined to the syndrome under discussion in this paper. Many papers included it among various forms of aseptic meningitis and internal hydrocephalus. Occasionally it was discussed in conjunction with the diagnosis of brain tumors. Nowhere was there a clear-cut presentation of the encephalographic features.

Quincke[1] in 1893 described a condition which he named "serous meningitis." In a more detailed paper in 1896 he called attention to its occurrence chiefly in young females, associated with ear infection, head injuries, overwork, alcoholism, influenza, pregnancy, or exposure to inclement weather. He considered as characteristic of this condition increased intracranial pressure with clear, colorless fluid. His series undoubtedly contained some cases which were similar to ours, but in the majority there was also internal hydrocephalus. This was true in the seven cases examined *post mortem*. Quincke believed that the excess of cerebrospinal fluid in these cases was the result of hypersecretion of the choroid plexuses and that the mechanism was perhaps similar to effusion into the joints or peritoneal cavity, or into the skin as in urticaria or angioneurotic edema. He even suggested the name "angioneurotic hydrocephalus."

In 1913 Passot,[2] in a thesis on meningitis and "aseptic meningeal states of otitic origin," presented a classification of these conditions in which one group, which he called "serous meningitis," was characterized by an increase of cells and protein in the cerebrospinal fluid. A second group, which he called hypertensive "meningeal state" or "meningeal hydrops," was characterized by normal fluid except for the increased pressure. The second group he subdivided into two classes: those with internal hydrocephalus and those with normal ventricles but increased subarachnoid fluid. It is this latter class which corresponds to the cases in our series. Although Passot recognized this syndrome precisely, he had only one case that was verified. This was not by

* From the Departments of Neurosurgery and Radiology, Neurological Institute of New York.

encephalography, which had not yet been discovered, but by brain puncture, which failed to reveal an internal hydrocephalus.

Passot described the clinical picture as consisting of headache, drowsiness, and papilledema. Nausea and vomiting he believed to be uncommon, and meningeal symptoms rare. The temperature was normal; the pulse, which was at first rapid, later became slow. If the increased intracranial pressure remained unrelieved, secondary optic atrophy and blindness might ensue. In one case, which was treated by craniotomy, an excess of fluid was found in the subarachnoid space. He suggested lumbar puncture as the most effective form of therapy.

Warrington[3] in 1914 presented an inclusive review of the intracranial serous effusions of inflammatory origin. Among the cases discussed, comprising those from the literature and from his own experience, some undoubtedly belonged to the group under consideration. He also believed that the etiological factor was an inflammatory condition secondary to which the intracranial effusion occurred. This might be in the nature of a toxin reaching the meninges while the organisms producing the toxin were located external to them; or an actual passage of attenuated organisms occurs into the cerebrospinal-fluid spaces. Since his discussion was not limited to the particular group in which we are interested, his observations on the morbid processes and clinical course and changes in the cerebrospinal fluid are not quite pertinent to our subject.

Symonds[4] in 1931, impressed by the frequent relation of these cases with otitic infection, suggested "otitic hydrocephalus" as the name for this condition. He discussed the literature in considerable detail and presented three cases from his own experience. No encephalographic nor ventriculographic studies, however, were made, and in only one case was a ventricular puncture performed that revealed an internal hydrocephalus. It is obvious then that Symonds also included internal and external hydrocephalus in his conception of this condition and was thus taking a somewhat broader view than is being considered in the present paper.

In accordance with his viewpoint these cases were limited almost always to children or adolescents in whom a preliminary otitic infection had occurred. Aside from the signs of increased intracranial pressure, their condition was unusually good. Localizing signs were usually absent except for occasional sixth-nerve paralysis on the side of the otitis. Rarely unilateral or bilateral convulsive seizures might occur, or the plantar response on one or both sides might be extensor. The cerebrospinal fluid was clear with a pressure often above 300 mm. of water, the quantity abundant, and no excess of protein or cells existed.

Case reports

The present paper is concerned with a series of 15 cases presenting, in common, evidence of increased intracranial pressure and usually no abnormal neurologic signs. The cerebrospinal fluid was normal except in one case. The pneumoencephalograms invariably showed the ventricular system to be normal in size, shape, and position. Etiologically, some of the cases appeared to be associated with ear infection; the syndrome in others was preceded by infection elsewhere in the body; while in the remainder, no history nor evidence of infection could be elicited.

Case 1 (N.I. No. 16337). *Headache, nausea, vomiting, papilledema, slight ataxia. No history of recent infection. Normal ventriculograms. Suboccipital decompression. Improvement.*

June 13, 1933: D. F., a nine-year-old girl was admitted.

Without antecedent trauma or infec-

TABLE 1

SUMMARY OF 15 CASES OF HYPERTENSIVE MENINGEAL HYDROPS

Case Name	N.I. No. Age Sex	Complaint Duration	Past Hist.	Neurologic Status	Spinal Fluid	Plain Skull	Xray Mastoid	Ventriculography	Operation	Course in Hospital	Follow up
1 D.F.	16337 9 F	1. Headache..... 3 mos. 2. Nausea and vomiting.... 3 mos.	No otitis	1. Choked disc,2 D. 2. Slight ataxia, left 3. Slight positive reflex, right	Cells.....0 Tot. Prot...25 mg. Otherwise..neg.	Increased intra-cranial pressure	Normal	Normal, air in cisterns, also subdural	Suboccipital exploration, negative	Improved	Improved
2 J. F.	10849H 38 M	1. Failing vision.. 4 mos. 2. Frontal headaches..... 4 mos. 3. Drowsiness.... 4 mos.	Negative	1. Choked disc, 4 D. 2. Sl. left facial	Cells.....2 Tot. Prot...33–75mg. Neg. gold & Wass. 4 blood Wass.	Increased pressure	Probably normal	None made	Right subtemporal	Improved	Markedly improved
3 A. S.	18183 37 F	1. Blurring vision. 6mos. 2. Pain in right eye 6 mos. 3. Buzzing, right ear..... 6 mos.	No otitis	1. Choked disc, 4–5 D.	Cells.....9–14 Tot. Prot...25–27 mg. Glob.....0 Otherwise..neg.	Increased intra-cranial pressure	Normal	Normal, air in cisterns, also subdural	Right subtemporal	Improved	Markedly improved
4 I. D.	11161 28 F	1. Headache..... 2 yrs. 2. Dizziness..... 2 yrs. 3. Failing vision.. 8 mos.	No otitis	1. Choked disc, 5 D.	Cells.....5–40 Tot. Prot...21–45 mg. Glob.....0–1+ Otherwise..neg.	Increased intra-cranial pressure	Probably normal	Normal encephalogram Ventriculogram failed	Right subtemporal	Improved	Markedly improved
5 H. S.	B17529 4½ F	1. Headache..... 2 mos.	Otitis media (2 mos. ago)	1. Choked disc, 5–6 D. 2. Positive Macewen		Increased intra-cranial pressure	Bilateral mastoid-ectomy	Small ventricles by Ventricular estimation	Right subtemporal	Improved	Markedly improved
6 M. M.	4663 19 F	1. Failing vision.. 2 yrs. 2. Severe headache 2 mos. 3. Vomiting..... 1 mo.	otitis media (2 yrs. ago)	1. Choked disc, 2–3 D.	Cells.....0 Tot. Prot...15 mg. Glob.....0 Otherwise..neg.	Normal	Normal	Air in cisterns, also subdural, normal	Right subtemporal	Improved	Normal
7 F. P.	18666 40 F	1. Blurring vision. 6 mos. 2. Headache..... 6 mos.	Otitis bilat. with mastoid bilat. at onset	1. Choked disc, 2D.	Cells.....5 Tot. Prot...14 mg. Otherwise..neg.	Increased intra-cranial pressure	Bilateral mastoid-ectomy	Normal encephalogram	Right subtemporal	Improved	Not heard from
8 F. H.	16108 32 F	1. Headache..... 1 mo. 2. Vomiting..... 1 mo. 3. Drowsiness.... 1 mo.	No otitis	1. Choked disc, low grade 2. Left, hemiparesis	Negative	Normal	Right chronic mastoiditis	Ventriculogram—no air in ventricles; air in sulci. Encephalogram—normal.	Right subtemporal	Improved	Improved
9 F. G.	18259 41 M	1. Failing vision.. 6 wks. 2. Dizziness ..... 6 wks. 3. Numbness in fingers..... 6 wks. 4. Hissing in left ear..... 6 wks.	Otitis 12 years ago	1. Choked disc, 5–6 D. 2 Ataxia, mod. wide base	Cells.....66 Glob.....1+ Tot. Prot...45 mg. Otherwise..neg.	Increased intra-cranial pressure	Bilateral sclerosis	Ventriculogram-normal, air in cisterns and sulci. Encephalogram—also normal	Right subtemporal	Improved	Died

Case Name	N.I. No. Age Sex	Complaint Duration	Past Hist.	Neurologic Status	Spinal Fluid	Plain X ray		Ventriculography	Operation	Course in Hospital	Follow up
						Skull	Mastoid				
10 A. W.	18481 43 F	1. Failing vision . . 15 mos.	No otitis Oöphorectomy Hysterectomy Adenoidectomy Tonsillectomy Hemorrhoidect. Cholecystect. Appendectomy	1. Bilateral anosmia 2. Choked disc, 2 D. 3. Blind in rt. eye	Cells . . . . . 6 Glob. . . . . 0 Tot. Prot . . . 40 mg. Otherwise . . neg.	Increased intracranial pressure	Normal	Ventriculogram-normal, slight amt. air in cisterns. Encephalogram normal, small amt. of air	Left subtemporal	Unimproved	Improved
11 M. B.	18433 20 F	1. Headache . . . . . 1 mo. 2. Failing vision . . 1 mo. 3. Diplopia . . . . . 1 mo. 4. Tinnitus . . . . . 1 mo. 5. Obesity . . . . . 4 yrs.	No otitis	1. Choked disc, 4–5D. 2. Babinski positive on right 3. Slight left facial 4. Positive Wassermann	Cells . . . . . 0 Glob. . . . . 0 Tot. Prot . . . 11–15 mg. Otherwise . . neg.	Negative	Normal	Ventriculogram—normal, small amt. of air; encephalogram—normal, air in sulci and cisterns	None	Improved	Not heard from
12 R. N.	21835 13 M	1. Headache . . . . . 12 da. 2. Pain in left eye . 9 da. 3. Diplopia . . . . . 9 da. 4. Fatigue . . . . . 9 da. 5. Vomiting . . . . . 9 da.	No otitis	1. Choked disc, 2–3 D. 2. Left internal strabismus 3. Absent left abdominal 4. Obese	Cells . . . . . 2 Glob. . . . . 0 Tot. Prot . . . 3 mg. Otherwise . . neg.	Negative	Normal	Encephalogram—ventricles slightly dilated and slightly asymetrical; cisterns normal	Right subtemporal	Improved	Improved
13 I. H.	24097 24 M	1. Headache . . . . . 5 mos. 2. Nausea . . . . . 5 mos. 3. Failing vision . . 5 mos.	No otitis Sinusitis Scarlet fever Pneumonia with femoral thrombosis	1. Choked disc, 4–5 D.	Cells . . . . . 2 Glob. . . . . 0 Tot. Prot . . . 10–12 mg. Otherwise . . neg.	Negative	Some evidence of chronic mastoiditis	Normal, air in cisterns	Right subtemporal; distended arachnoid	Improved	Improved
14 M. H.	25581 35 F	1. Headache . . . . . 2 mos. 2. Blurring . . . . . 3 wks. 3. Diplopia . . . . . 3 wks. 4. Tinnitus . . . . . 2 wks. 5. Vomiting . . . . . 3 da.	No otitis Left-handed Obese Probably cholecystitis	1. Choked disc, 2D 2. Left weakness	Cells . . . . . 0 Glob. . . . . 0 Tot. Prot . . . 20 mg. Otherwise . . neg.	Increased intracranial pressure	Normal	Normal, some air in sulci and cisterns	Left subtemporal; no increased pressure (3 hrs. after ventriculogram)	Improved	Improved
15 L. M.	24403 12 F	1. Spasms of left face . . . . . 2 wks.	No otitis ? Ant. Polio. 3 yrs. ago.	1. Choked disc, 3 D.	Cells . . . . . 12 Glob. . . . . 0 Tot. Prot . . . 20 mg. Otherwise . . neg.	Increased intracranial pressure	Normal	Normal, small amount of air; much air in sulci and cisterns	Right subtemporal; distended arachnoid	Improved	Improved

tion, about three months before entering the hospital the child awoke one morning with a complaint of severe headache, extending from the frontal to the occipital regions. The ache lasted about one-half hour and was repeated late in the afternoon. From that time on she had daily attacks of similar character. About twice a week she also vomited, sometimes without accompanying headache. The vomiting was usually preceded by nausea. A month before admission she had been relieved of her symptoms for a week following a lumbar puncture.

Aside from measles at 13 months of age the child had been singularly well, without colds, ear infections, or more serious ailments.

Neurological Examination: The left deep reflexes seemed slightly greater than the right. The optic discs each showed about 2 diopters of swelling. There appeared to be a slight ataxia in succession movements performed with the left hand.

Laboratory Examination: Routine blood and urine tests were essentially negative. The ventricular fluid showed no cells and 25 mg. of total protein per 100 c.c.

Roentgen Examination: Plain films of the skull gave evidence of increased intracranial pressure but no localizing signs of tumor.

Ventriculograms showed the ventricles to be normal as to size, shape, and position.

Course in Hospital: June 19, 1933. A suboccipital exploration and decompression were performed. No evidence of tumor was found. The child made a prompt, uneventful recovery and was discharged July 4, 1933.

Subsequent Course: She was seen twice during the month following discharge and showed improvement in her optic discs each time. After this she returned to her home in Florida and has not been seen since.

Case 2 (N.I. No. 10849H). *Failing vision, headache, drowsiness, papilledema, positive blood Wassermann. Subtemporal decompression. Improvement.*

December 12, 1931, J. F., a 38-year-old male was admitted.

The symptoms had come on rather suddenly four months before admission, with headaches, drowsiness, and rapidly failing vision. About six weeks before entry he was a patient at another hospital for these complaints and while there was said to have had a transient weakness of one side of the face.

No additional data of any importance were elicited. The patient denied all venereal infection. He was married and had three healthy children. His wife had never had any miscarriages.

Neurological Examination: There was marked papilledema of both optic discs (4 diopters in each eye). The visual fields showed considerable bilateral enlargement of the blind spots. There was also slight left-central, facial weakness, but no other positive changes.

Laboratory examination: Routine blood and urine tests and chemical examination of the blood were negative. The blood Wassermann reaction was 4+ in two antigens. The spinal fluid examined four times showed an average of 2 cells per cu. mm.; total protein of 33 to 75 mg. per 100 c.c.; negative Wassermann and colloidal gold curve.

Roentgen Examination: Plain films of the skull showed signs of generalized increase of intracranial pressure. No ventriculograms were made.

Course in Hospital: January 8, 1932, a right subtemporal decompression was made, at which time the right lateral ventricle was reached at a normal depth; the size of the ventricle was normal. The

subarachnoid spaces were distended with fluid which was evacuated freely when the membrane was incised.

The patient was treated, in addition, by repeated lumbar punctures, dehydration, and intravenous and intramuscular antiluetic therapy.

At the time of his discharge, on February 12, 1932, the discs showed considerable secondary atrophy but only 1 diopter of elevation. He was free from his preoperative symptoms.

Later Course: He was seen repeatedly at the follow-up clinic with practically no complaints. The Wassermann reaction in his blood became negative, and at his last visit, on July 5, 1934, he had secondary optic atrophy but good visual power and no headaches.

Case 3 (N.I. No. 18183). *Blurred vision, headache, tinnitus, papilledema. No history of infection. Normal encephalograms. Subtemporal decompression. Improvement.*

December 4, 1933, A. S., a 37-year-old woman was admitted.

Quite suddenly one day, about six months before admission, she had experienced a veil over her right eye which shut out her vision so that if she closed her left eye things "went black" before her. This sensation had recurred frequently, especially in the morning when first getting up. Beginning about the same time she also felt a swishing sensation in her head which she believed was synchronous with her pulse. Headaches of a relatively mild character began at this time, located over the right eye.

She had never had any serious illnesses, except pneumonia as a child. She had never had otitis media. Her husband and one child were reported living and well; one child died at birth; no miscarriages had ever occurred and there was no history of venereal infections.

Neurological Examination: Each optic disc was swollen to an elevation of 4 to 5 diopters, and corresponding enlargements of the blind spots were present. The remainder of the examination revealed nothing abnormal.

Laboratory Examination: Except for a mild degree of secondary anemia all routine tests on the blood and urine, blood chemical and serological examinations were negative. The spinal fluid showed 9 to 14 cells, negative globulin, 25 to 27 mg. of total protein per 100 c.c., negative Wassermann reaction and gold curve. On one examination sugar was quantitated at 56 mg. per 100 c.c. and chlorides at 750 mg. per 100 c.c.

Roentgen Examination: Plain films of the skull showed signs of increased intracranial pressure without localizing signs of tumor. Films of the sinuses were negative, as were also films of the teeth.

Encephalograms showed the lateral ventricles to be normal in size, shape, and position. The third ventricle was in the midline, and the aqueduct of Sylvius appeared normal in size and shape.

Course in Hospital: December 19, 1934, a large right subtemporal decompression was made, from which the patient recovered promptly. By the time of her discharge, on December 28, 1933, the swelling of the discs had been reduced to 2 diopters in each eye.

Subsequent Course: The patient was seen repeatedly at the follow-up clinic, and at her last visit on July 12, 1934, she was better than at any time previously. She still had occasional mild headaches, and her discs still showed some blurring of the margins with 1 diopter elevation in each eye. The decompression was moderately tense, but the patient admitted that she had not been following the dehydration measures outlined for her.

Case 4 (N.I. No. 11161). *Headache,*

dizziness, failing vision, papilledema. No history of infection. Normal ventriculograms and encephalograms. Subtemporal decompression. Improvement.

January 12, 1932, I.D., a 28-year-old woman was admitted.

Over two years before admission the patient had begun to have frequent, not very severe, generalized headaches, accompanied sometimes by tinnitus and subjective vertigo. About eight months ago her vision became foggy. She sought relief with eyeglasses but failed to obtain it. Three months before entering the hospital all her symptoms suddenly became more severe.

She had had measles at seven years of age, scarlet fever at 10, influenza at 19; her health had otherwise been good.

Neurological Examination: There was considerable enlargement of the blind spot with bilateral papilledema of 5 diopters in each eye. The examination was otherwise essentially negative.

Laboratory Examination: Routine blood and urine examinations, blood chemical and blood Wassermann tests were all negative. The spinal fluid was under an initial pressure of 380 mm. of water; the cell count varied from 5 to 40 (R.B.C.), the total protein from 21 to 45 mg. per 100 c.c.; other tests were negative.

Roentgen Examination: Plain films of the skull showed some absorption of the calcium from the sella turcica, indicating increased intracranial pressure.

Ventriculograms were not very satisfactory, but in so far as any conclusions could be drawn from them the ventricular system appeared to be normal. Later encephalograms, however, showed the ventricular system well outlined by air and its appearance definitely to be within normal limits.

Course in Hospital: A right subtemporal decompression was made on January 19, 1932. The dura was tense, but the tension was immediately relieved by the release of subarachnoid fluid. Nothing abnormal was seen on exposure of the brain. The pressure did not seem to correspond to the high degree of papilledema which the patient presented.

Following operation, and after repeated lumbar drainages and dehydration therapy, the swelling of the discs was reduced to between 2 and 3 diopters at the time of her discharge, on March 9, 1932.

Subsequent Course: The patient was seen on numerous occasions in the follow-up clinic. A mild degree of papilledema persisted for at least one year after she left the hospital.

At her last visit, on July 5, 1934, she complained of tearing of the eyes in bright light. Her discs showed marked secondary atrophy, but she was able to continue at her trade as a milliner. The decompression was slightly bulging and was reported occasionally to grow quite tense.

Case 5 (N.I. No. B.17529). *Headache, papilledema. History of otitis media and mastoiditis. Normal encephalograms. Dehydration. Improvement.*

April 11, 1929, H. S., a 4½-year-old girl, was admitted.

About two months before admission to this hospital the child had developed bilateral purulent otitis media. A left mastoidectomy was performed, but very little inflammation was found. A few days later, however, she showed signs of left lateral sinus thrombosis from which she suffered severe headaches. These became reduced in severity after ligation of the left jugular vein. Meanwhile, in spite of steady improvement in her general health, repeated examinations revealed progressive choking of the optic discs.

She had had pertussis at the age of two years, but had been otherwise in good health until her present illness.

Neurological Examination: The child had a somewhat enlarged head with a positive Macewen sign. The discs showed swelling of between 5 to 6 diopters in both eyes, but the examination was otherwise negative.

Laboratory Examination: Routine blood tests were negative.

Roentgen Examination: Plain films of the skull showed the convolutional markings to be somewhat prominent and the coronal suture slightly separated, indicating increased intracranial pressure.

Course in Hospital: A bilateral ventricular puncture was made on April 13, 1929. No internal hydrocephalus, indeed quite small ventricles were found. A right subtemporal decompression was then made. The dura was found to be moderately tense, but when a nick was made in the piarachnoid, fluid squirted up to a height of at least 10 cm. As a result of the evacuation of this fluid the tension was completely released by the end of the operation. At the time of her discharge from the hospital, on April 27, 1929, the discs showed a diminution of swelling to about 3 diopters.

Subsequent Course: She was seen last on November 28, 1931 (about two-and-a-half years after the operation). She was quite well except for chronic otorrhea. Her discs showed marked secondary atrophy, but her vision was quite good.

Case 6 (N.I. No. 4663). *Failing vision. Severe headaches. Vomiting, papilledema. History of otitis media. Normal encephalograms. Subtemporal decompression. Improvement.*

June 25, 1930, M. M., a 19-year-old girl was admitted.

About two years ago the patient began to notice a diminution in visual acuity which was not helped by the fitting of glasses. This visual disturbance to a considerable degree was undoubtedly due to extraocular-muscle palsy since it consisted of blurring of objects, which cleared up when looking with one eye alone.

About two months before admission she immigrated to the United States from Ireland, and made a very comfortable trip, but on arrival in New York began to have severe frontal headaches. A month later she began to vomit frequently and was severely nauseated. A week later her eyes became crossed and she saw double.

Her past history was essentially negative except for otitis media about two years ago, preceding by a brief period the onset of her present illness.

Neurological Examination: The optic discs showed bilateral papilledema of 2 to 3 diopters; and the visual fields, enlargement of the blind spots. The remainder of the examination was negative.

Laboratory Examination: Routine blood and urine tests, blood chemical and serological tests were entirely negative. The spinal fluid showed no cells, 15 mg. of total protein per 100 c.c., and negative Wassermann reaction.

Roentgen Examination: Plain films of the skull gave no evidence of localized disease nor of increased intracranial pressure. Ventriculograms showed the ventricular system to be well filled and normal in size, shape, and position. Films of the chest indicated no evidence of disease.

Course in Hospital: July 17, 1930, a right subtemporal decompression was made. The dura was found to be under considerable tension, but as soon as this membrane was incised and a nick made in the piarachnoid, fluid spurted out to a height of 7 or 8 cm. and tension became reduced. The patient made an uneventful recovery and the combined effects of the decompression and dehydration therapy resulted in a recession of the papilledema by the time she was discharged from the hospital, on October 11, 1930.

Subsequent Course: The patient was

seen on numerous visits and for about two years after her discharge continued to complain of some headache. The decompression was slightly bulging, the optic discs were hazy, and she showed from time to time vague signs of incoordination. At her last visit on January 18, 1934, she was in excellent physical condition, her neurological status was negative, and roentgenograms of the skull, aside from the operative defect, were normal.

Case 7 (N.I. No. 18666). *Blurring vision. Papilledema. History of otitis media. Mastoiditis. Normal encephalograms. Subtemporal decompression. Improvement.*

January 20, 1934, Mrs. F. P., aged 40 years, was admitted.

About six months before admission to the hospital the patient had had a sudden right earache, which resulted in a few days in a spontaneous rupture of the drum with evacuation of pus. Drainage continued, but the pain on this side of the head also persisted. Two months later a mastoidectomy on the right side was performed and was followed by dizziness, tinnitus, and stiffness of the neck. Two months ago her left ear began to discharge and a mastoidectomy also had to be performed on this side. One month following operation she first noted blurring of vision.

Three years ago the patient fainted in a bath house, striking the back of her head. She was unconscious for 10 minutes and since then has been aware of a "heaviness" of the head. There were no other illnesses of importance.

Neurological Examination: The only definitely positive finding was bilateral papilledema of about 2 diopters. The other changes were uncertain and consisted of slight asymmetry of the deep reflexes.

Laboratory Examination: Routine blood and urine tests were essentially negative. The blood Wassermann reaction was negative. The spinal fluid showed 5 cells per cu. mm. and a total protein of 14 mg. per 100 c.c.

Roentgen Examination: Plain films of the skull showed evidence of increased intracranial pressure without localizing signs of tumor. Encephalograms showed a normal ventricular system, normal cisterns, and normal sulci.

Course in Hospital: A right subtemporal decompression was performed on January 26, 1934. The brain was found to be under diminished pressure, perhaps because of the rigid dehydration regime before operation. At the time of her discharge, February 8, 1934, the patient's vision had improved and the swelling of the discs had become markedly diminished.

Case 8 (N.I. No. 16108). *Headache, vomiting, drowsiness. Papilledema. No history of infection. Normal encephalograms. Subtemporal decompression. Improvement.*

July 26, 1933, Mrs. F. H., 32 years of age was admitted.

About one month before admission the patient began to be drowsy during the day, even though she slept well at night. One week later she fell and hurt her nose. From that time on severe parieto-occipital headaches began which necessitated her confinement to bed. When she tried to get up she became dizzy and on two occasions vomited. She complained frequently of seeing double, although no strabismus was noted. On the day preceding admission she became comatose and did not recover until after admission and the administration of intravenous hypertonic dextrose solution. She was also incontinent of urine and vomited frequently. When aroused from her stupor she seemed fairly well oriented.

No history of ear infection was obtain-

able, and venereal infection was denied. She had been married only a short time and had never been pregnant.

Neurological Examination: There was nystagmus to either side. The optic discs showed a low grade of papilledema with some atrophy. A slight left lower facial paresis was present as well as a left hemihypalgesia. The deep reflexes were greater on the left than on the right side.

Laboratory Examination: Routine blood, urine, blood chemical tests, blood Wassermann reaction, and spinal-fluid examination were all entirely negative.

Roentgen Examination: Plain films of the skull showed it to be entirely normal. Attempted ventriculograms showed no air in the ventricles but many of the sulci and basal cisterns were well outlined with gas. Encephalograms made immediately after the ventriculograms showed the entire ventricular system to be slightly smaller than usual in size and normal in shape and position (figs. 1, 2, 3, and 4).

Course in Hospital: A right subtemporal decompression was made July 28, 1933. The brain bulged slightly through the wound and the subarachnoid spaces were quite tensely filled—although the fluid was largely replaced with air, since the operation was performed immediately after pneumencephalography. She continued to have spells of drowsiness for several weeks, but eventually recovered and was discharged improved on August 31, 1933.

Subsequent Course: Several reports from her family physician since her discharge indicated continued improvement.

Case 9 (N.I. No. 18259). *Failing vision, dizziness, papilledema. Chronic otitis media. Normal encephalograms. Subtemporal decompression. Improvement. Died at home two months after discharge. Necropsy, normal intracranial contents.*

December 9, 1933, Mr. F. G., aged 41 years was admitted.

Nine weeks before admission, the patient had had a left mastoidectomy performed for a chronic mastoiditis. During the operation the left lateral sinus was injured, but bleeding was easily controlled. About six weeks ago he began to experience numbness and tingling of the finger tips and also frontal headaches. With the first headache he developed blurring of vision and weakness of the right arm and leg which had since improved. His gait became unsteady and dizziness as well as hissing in the left ear had been constant for a month.

The patient had had no serious illness except for left otitis media 12 years before, since which time this ear had been chronically discharging purulent material.

Neurological Examination. The patient walked with a wide base and had an ataxic gait. The left upper extremity also showed quite marked incoördination. Some rigidity of the neck and suboccipital tenderness were present. The remainder of the examination was negative except for a papilledema of 5 to 6 diopters in each eye, with diminution in the visual acuity and enlargement of the blind spots.

Laboratory Examination: Routine blood, urine, and blood Wassermann tests were all negative.

Roentgen Examination: Plain films of the skull showed signs of increased intracranial pressure but no localizing signs of brain tumor.

Course in Hospital: The patient was put upon a dehydration regime and the swelling of the discs improved considerably, so that he was allowed to go home for the Christmas holidays. Upon readmission, ventriculography was attempted, but air failed to enter the ventricles. Encephalograms, however, showed normal ventricles and a normal subarachnoid system.

The spinal fluid removed during encephalography showed 66 cells (98 per-

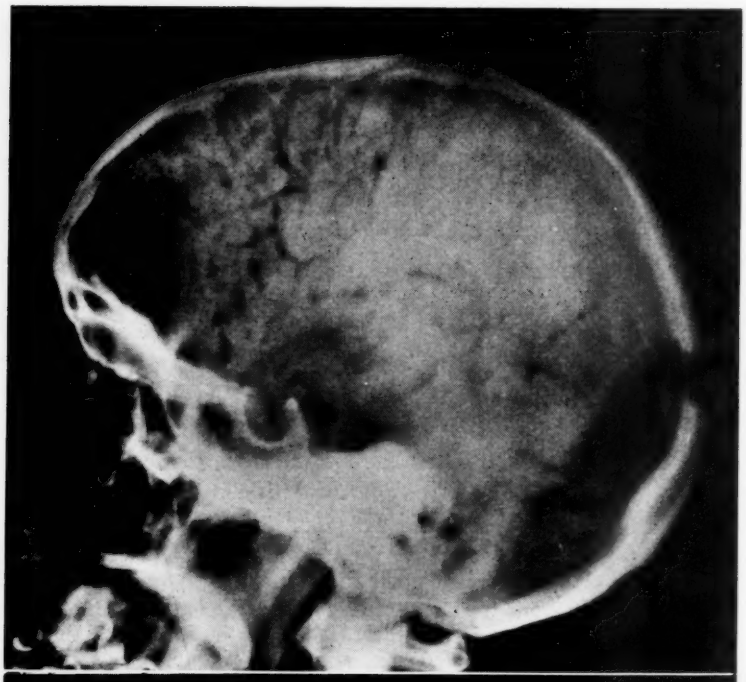


Fig. 1 (Davidoff and Dyke). Case 8. Lateral roentgenograms of the skull following attempted injection of air into the ventricles. No air remained in the ventricular system but it escaped along the needle tract and outlined the subarachnoid spaces.

Fig. 2 (Davidoff and Dyke). Case 8. Anteroposterior encephalogram showing the ventricular system to be normal in shape and position and somewhat smaller than normal in size.

Fig. 3 (Davidoff and Dyke). Case 8. Posteroanterior encephalogram showing again the somewhat small ventricular system.

Fig. 4 (Davidoff and Dyke). Case 8. Lateral encephalogram. Note the rather coarse sulci markings in the frontal region indicating excessive subarachnoid fluid.

cent lymphocytes) 1 plus globulin, 45 mg. total protein per 100 c.c., 46 mg. sugar per 100 c.c., 740 mg. chlorides per 100 c.c. and negative Wassermann and colloidal gold reactions.

January 19, 1934, a subtemporal decompression was made, and the brain found to be under a moderate degree of tension. At the time of discharge, on January 29, 1934, the patient's vision had improved, and the choking of his discs had diminished to 2 diopters in each eye.

Subsequent Course: The patient died at home March 27, 1934, but a post-mortem examination was performed and the brain studied in the Neuropathology department of the Neurological Institute. It was found to be normal both grossly and microscopically.

Case 10 (N.I. No. 18481). *Failing vision, nervousness, papilledema. History of systemic infection. Normal encephalograms. Subtemporal decompression. Improvement.*

January 5, 1934, A. W., a 43-year-old woman, was admitted.

Five days after an operation for removal of the uterus and ovaries (October, 1932) the patient had had a sudden serious impairment of visual acuity. This improved in about a week, and she remained well until April, 1933. At this time she began to have periods of complete blindness, momentary in duration, occurring many times a day. Between the spells her vision returned but seemed to be growing progressively worse. This was especially true of the right eye, which became practically blind in July, 1933, retaining only light perception. One month later the left eye began to show diminishing visual acuity. There have been no other complaints except of nervousness and weakness. She claimed to have been completely anosmic all her life.

The patient had had a tonsillectomy and adenectomy as well as a removal of a nasal polyp in 1921; an appendectomy and cholecystectomy in 1927. In 1928 she had pneumonia, while in 1930 she had had a hemorrhoidectomy. The hysterectomy and bilateral oöphorectomy already mentioned were performed in 1932. There was no history of middle-ear infection.

Neurological Examination: The patient was an obese, left-handed, middle-aged woman. The general physical examination was negative. She showed complete bilateral anosmia. The visual acuity was markedly diminished, being 8/200 in each eye. The optic discs showed a bilateral swelling of 2 diopters. The visual field was not obtainable in the right and showed a marked concentric constriction in the left eye. The pupils reacted sluggishly to light.

Laboratory Examination: Routine tests of the blood, blood Wassermann, and urine were negative. The spinal fluid showed 6 cells, was negative for globulin, and the total protein was negative.

Roentgen Examination: The films of the skull indicated a moderate atrophy of the sella turcica. The encephalograms showed the lateral and third ventricles to be normal in size, shape, and position. The aqueduct of Sylvius and fourth ventricle were not visualized, and there was no gas in the basal cisterns. The ventriculograms showed essentially the same picture except that there was some gas in the cisternae interpeduncularis and lamina terminalis.

Course in Hospital: On January 18, 1934, a left subtemporal decompression was made. The dura mater was under considerable tension, and when this membrane was incised the arachnoid was also perforated, and a large amount of clear colorless fluid squirted out under considerable pressure. The brain appeared to be normal.

Subsequent Course: The patient made an uneventful recovery from the operation but showed no improvement in vision

while in the hospital. She was discharged on January 31, 1934, and was seen repeatedly in the follow-up clinic. When last seen on January 16, 1936, the decompression was soft and flat and she had no other complaints except her defective vision. Ophthalmologic examination showed complete amaurosis in the right eye; the left eye showed improvement in vision and a widening of the visual field in the upper half.

Case 11 (N.I. No. 18433). *Headache, failing vision, diplopia. Papilledema. Slightly positive blood Wassermann. Normal ventriculograms. Dehydration and antiluetic therapy. Improvement.*

January 1, 1933, Mrs. M. B., 20 years old, was admitted.

The patient had been well until about a month before admission except for a steady rather rapid gain in weight over a period of four years. At 16 she weighed 125 lbs. (56.8 kgm.) and at the time of the anamnesis 234 lbs. (106.3 kgm.) Her acute symptoms began with severe bitemporal headaches as well as noises in both ears. Her vision began to fail rather rapidly and she also had some double vision. There were no other complaints.

The patient had one healthy child, 18 months of age, and had had no abortions nor miscarriages. Her parents and husband were well. She had had no serious illness in her life, and no history of ear infection.

Physical and Neurological Examination: The patient was a young obese woman but showed no other endocrinological nor physical abnormalities. There was a very indefinitely positive Babinski sign on the right. The optic discs showed advanced bilateral swelling of 4 to 5 diopters, the visual fields were normal except for an increase in the size of the blind spots. Visual acuity was 20/50 in each eye with correction. There was present a very slight incoördination of the ocular-muscle movements. The face showed a slight degree of flattening around the mouth on the left side. The neurological status was otherwise negative.

Laboratory Examination: Routine blood examinations were negative. Urine tests showed a faint trace of albumin, but no casts, and good power of concentration. Kidney function tests were normal. Sugar-tolerance tests were normal. Repeated blood Wassermann tests were slightly positive (1 to 2 plus) with either one or the other antigen. Spinal-fluid examination showed a normal cell count, negative globulin, 11 to 15 mg. of total protein per 100 c.c. The colloidal gold curve and spinal-fluid Wassermann reactions were negative.

Roentgen Examination: Plain films of the skull were negative. The calcified pineal shadow was in its usual position. The optic foramina appeared normal. Ventriculograms showed the lateral ventricles to be normal in size, shape, and position. The third ventricle contained only a small amount of air. The aqueduct of Sylvius and the fourth ventricle were not visible. Encephalograms showed no air in the ventricles, but the major sulci and basal cisterns were visualized and appeared to be normal.

Course in Hospital: The patient received mild antiluetic therapy and was, in addition, kept on a dehydration regimen consisting of limitation of fluid intake to 800 c.c. for 24 hours and daily doses of magnesium sulphate. Her vision improved considerably, although the degree of papilledema did not diminish during her hospital stay.

The patient was discharged to her private physician on January 31, 1933, and has not been heard from since leaving the hospital.

Case 12 (N.I. No. 21835). *Headache, diplopia, papilledema, left internal strabis-*

mus. No history of infection. Normal ventriculograms. Subtemporal decompression. Improvement.

October 30, 1934, Robert N., 13 years old, was admitted.

The patient had been well until 12 days before entering the hospital, when he complained of severe generalized headache. The headache continued for three days, after which vomiting was added to his complaints. He vomited nearly everything for three days until he was finally relieved of both the pain in the head and the vomiting after the removal of impacted feces. Meanwhile he began to see double, and his legs became easily fatigued. With these complaints he was admitted to the hospital. No history of otitis media nor other illness of serious nature was noted.

Physical and Neurological Examination: The patient was a tall, moderately obese boy, with a definitely feminine habitus. There was a feminine distribution of fat and undersized genitalia. No pubic nor axillary hair was present. The fingers were long and tapering. The deep reflexes were diminished except for the Achilles jerks, which were hyperactive. The abdominal reflexes were sluggish on the right and absent on the left. No abnormal reflexes were present. The optic discs showed bilateral papilledema of 2 to 3 diopters, but visual acuity and visual fields were normal. Left internal strabismus was present.

Laboratory Tests: Routine blood counts, blood chemical tests, blood Wassermann reaction, and urine examination were all negative. Spinal-fluid examination showed two cells, negative globulin, 13 mg. of total protein per 100 c.c., and negative colloidal gold curve and Wassermann reaction.

Roentgen Examination: Films of the skull showed no evidence of increased intracranial pressure and no abnormal calcification. The pineal body was visible and in its normal position. Ventriculograms showed the lateral ventricles to be slightly dilated and slightly asymmetrical, the left being somewhat larger than the right. The third ventricle was normal, but the aqueduct of Sylvius and the fourth ventricle contained no gas. Several of the subarachnoid cisterns were visualized and appeared normal.

Course in Hospital: November 9, 1934, a right subtemporal decompression was performed, but only the outer layers of the dura were opened. The subarachnoid space was, therefore, not seen. The dura mater was found to be under considerable tension. Before the patient left the hospital, on November 23, 1934, the strabismus had disappeared and the papilledema had subsided.

Subsequent Course: The patient was entirely well until December 9, 1935, when he complained of pain behind the right ear and awoke the next morning with an almost complete right peripheral facial paralysis. This had improved considerably, and other signs were absent. The eyegrounds were still normal when he was seen again about one month later.

Case 13 (N.I. No. 24097). *Failing vision, headache, nausea, papilledema. History of systemic infection. Normal ventriculograms. Decompression. Improvement.*

May 4, 1935, Irving H., 24 years old, was admitted.

About five months before admission, after a severe cold, the patient began to complain of severe intermittent headaches, each attack lasting two to three hours. Accompanying the headache was a feeling of nausea and blurring of vision. These difficulties were sufficiently grave to necessitate hospitalization. He was admitted to another institution where he received treatment for his sinuses and was discharged well in 10 days. He remained

well until two weeks before admission to this hospital. At this time, again after a cold, his former symptoms returned.

Aside from minor childhood diseases he had a moderately severe attack of scarlet fever without apparent complications. Three years before admission he had pneumonia complicated by a right-femoral-vein thrombosis which left him with a chronic ulcer of the right leg.

Physical and Neurologic Examination: The patient was a well-developed and well nourished young man, who aside from some mental torpor and a chronic ulcer of the right leg presented no obvious abnormalities. His neurologic status was negative except for bilateral papilledema of 4 to 5 diopters. The pupils were large and reacted poorly to light. The visual fields and visual acuity were normal.

Laboratory Tests: Routine blood counts, blood-Wassermann reaction, and urine examinations were negative. The spinal fluid showed two cells, negative globulin, 10 to 21 mg. of protein per 100 c.c. Colloidal gold curve and Wassermann reaction were negative.

Roentgen Examination: Films of the skull showed no evidence of increased intracranial pressure and no abnormal calcification. The pineal body was not visible. Ventriculograms showed the lateral and third ventricles to be normal in size, shape, and position in the anteroposterior views. In the left lateral views, the medial portion of the right lateral ventricle appeared to be slightly depressed. The impression was that the ventriculograms were probably normal.

Course in Hospital: May 10, 1935, a right subtemporal decompression was performed and the dura mater found to be quite tense. When this membrane was opened it was seen that the arachnoid was distended with fluid. Upon pricking the arachnoid the fluid spurted out in a stream 10 cm. high. After the evacuation of a large quantity of fluid the pressure was greatly reduced.

Subsequent Course: The papilledema gradually receded and the headache diminished after the operation. The patient was discharged June 21, 1935, and was last seen December 26, 1936, when he was free from symptoms, but the disc margins still showed some blurring, although the elevation had completely disappeared. The decompression, although still bulging, was quite soft.

Case 14 (N.I. No. 25581). *Headache, failing vision, tinnitus, dizziness. History of cholecystitis. Normal ventriculograms. Subtemporal decompression. Improvement.*

August 31, 1935, Mrs. M. H., aged 35 years, was admitted.

In June, 1935, the patient was confined to bed with chills, fever, and pain in the right lower portion of the chest, which was diagnosed as pleurisy. About this time she began to have almost constant generalized headaches. Within three weeks before admission to the hospital she began to complain of blurring of vision and diplopia associated with headaches, and for about two weeks, tinnitus and diminished acuity of hearing in the right ear. A few days before admission she was nauseated and vomited frequently.

Physical and Neurologic Examination: The patient was an obese, middle aged, left-handed, colored woman. There was a slight weakness on the left side. The optic discs showed bilateral papilledema of 2 diopters in each eye. There were extreme tenderness over the right temporal region and slight rigidity of the neck. The visual fields and acuity were normal.

Laboratory Examination: Routine examination of the blood showed a moderate secondary anemia. Routine blood-chemical and blood-Wassermann tests and urine examination were negative. The spinal-fluid examination revealed no cells, nega-

tive globulin, 20 mgm. of protein per 100 c.c. of spinal fluid, negative colloidal gold curve, and negative Wassermann reaction.

Roentgen Examination: The plain films of the skull showed the sella turcica to be atrophic. In the ventriculograms the lateral and third ventricles appeared to be normal in size, shape, and position. The aqueduct of Sylvius and fourth ventricle likewise appeared normal.

Course in Hospital: September 7, 1935, three hours following the ventriculography, a left subtemporal decompression was made. The dura mater was tense, and when opened the brain herniated through the defect. The arachnoid appeared normal and a normal amount of cerebrospinal fluid escaped.

The patient made an uneventful recovery for 11 days after the operation. On September 18, 1935, she complained of severe pain in the right upper chest radiating to the right upper quadrant of the abdomen and then around to the angle of the right scapula. Breathing was embarrassed because of pain. There was marked tenderness in the gall-bladder region and a few rales were present at the base of the right lung. This illness was associated with moderate fever and leucocytosis and resembled probably the episode in the patient's history which she described as pleurisy. She was given conservative treatment for what was thought to be acute cholecystitis. Within a week these symptoms and signs subsided. Meanwhile her papilledema disappeared, but the area of decompression showed considerable bulging. She was discharged October 3, 1935.

Subsequent Course: The patient was last seen on January 2, 1936, at which time her subjective complaints had largely disappeared. Her visual fields and acuity were within normal limits. Her eyegrounds, however, showed blurring of the disc margins and a moderate degree of exudate. The decompression, while soft, was still bulging.

Case 15 (N.I. No. 24403). *Twitching of left side of face. Papilledema. No history of recent infection. Normal ventriculograms. Subtemporal decompression. Improvement.*

May 27, 1935, L. M., a 12-year-old girl, was admitted.

The patient had apparently been well until two weeks before entering the hospital. At this time she had a sudden seizure consisting of spasmodic closure of the left eye and a spasmodic distortion of the left side of the face lasting about three minutes. There were no twitchings nor convulsive movements in any other parts of the body. She was conscious and continued to converse during the attack. During the two week period she had five sudden seizures.

The parents and six siblings were living and well. The patient had had no serious childhood illnesses except for what was thought to be an abortive attack of anterior poliomyelitis three years ago which left no sequelae.

Physical and Neurologic Examination: The patient was a well-developed and well-nourished preadolescent girl. There was a bilateral papilledema of 3 diopters. The visual acuity was normal, but the fields showed a concentric contraction. The deep reflexes were somewhat sluggish, but the remainder of her neurologic status negative.

Laboratory Examination: Routine blood, blood-chemical, and urine examinations were negative. The spinal fluid showed 12 cells, negative globulin, 20 mgm. of protein per 100 c.c.; colloidal gold and Wassermann reactions were negative.

Roentgen Examination: The plain films showed atrophy of the sella turcica and some separation of the coronal suture. The mastoids appeared normal. Ventricu-

lograms, made June 17, 1935, showed only a small amount of air to have entered the lateral ventricles, which appeared normal in size, shape, and position. The third ventricle, aqueduct of Sylvius, and fourth ventricle were not seen. The cerebral sulci and basal cisterns were well visualized and appeared normal.

Course in Hospital: June 21, 1935, a right subtemporal decompression was made, exposing a rather tense dura mater. When this membrane was incised the arachnoid was inadvertently punctured and a large quantity of fluid under increased tension gushed out. The cerebral cortex appeared somewhat injected. The child made an uneventful recovery from the operation, and before her discharge from the hospital her papilledema receded from 5 to 2 diopters. The decompression was bulging but soft. She was discharged July 3, 1935.

Subsequent Course: When last seen, October 24, 1935, she reported she had been free from seizures since operation. The decompression, although still bulging, was soft. The eyegrounds showed secondary atrophy, especially on the right, but no papilledema. The patient was attending school and seemed to be in normal health.

Discussion

This report is based upon 15 cases occurring at the Neurological Institute during a period of six years. The patients were all relatively young, the oldest being 43 years of age, the youngest 4½, the majority of them under 30 years. Eleven of the patients were females, and only four males.

Etiology: Four patients gave a history of otitis media; in three of these the ear infection occurred simultaneously with the onset of intracranial symptoms. In the fourth case, the otitis media occurred 12 years before the present illness but a chronic middle-ear infection persisted.

One patient had a long history of chronic illness in which a focus of infection was sought and the following organs had been removed: uterus, ovaries, gallbladder, appendix, adenoids, and tonsils. Another patient gave a history of pneumonia complicated by thrombosis of the femoral vein followed by ulceration of the leg. A third patient had attacks of cholecystitis, one of which was observed in the hospital. One patient had a four-plus blood-Wassermann reaction, and another a one- to two-plus reaction in the blood, but their spinal-fluid Wassermann tests were negative. Six patients gave no history nor presented evidence of infection which could be considered related to the present illness.

Symptoms: In practically all of the cases the outstanding symptoms were: headache in 11 cases and failing vision in 10; vomiting occurred in five, tinnitus in four, and dizziness was a major complaint in two. Diplopia was present in three cases. Other symptoms occurring once or twice were numbness in the fingers, pain in the left eye, and spasm of the left side of the face.

The duration of the symptoms was surprisingly short. In only two patients the illness had lasted for two years previous to admission to the hospital. One patient noted failing vision 15 months before admission. In all the others the duration of the disease was six months or less, the shortest being 12 days.

Neurologic Examination: The chief sign in all of these cases was papilledema, often of a high degree; that is, from 3 to 6 diopters. In 10 cases, there were practically no other neurologic signs with the possible exception of a diminished visual acuity which undoubtedly was a sequel to the swelling of the discs. In the remaining cases, such signs as were present were referable to the pyramidal system and were very slight in degree. These consisted of

slight increase of reflexes, slight central facial paresis and positive Babinski sign. In two cases, in addition to these signs there was some ataxia.

Spinal-fluid Examination: The spinal fluid showed a normal cell count in all but one case, in which 66 cells were present. The total protein was normal with the exception of one in which 75 mg. per 100 c.c. were present. The gold curve and spinal-fluid Wassermann reactions were negative in all cases. Globulin was negative except for one plus in the case with the high cell count. One patient showed a four-plus, and another, a one- to two-plus Wassermann reaction in the blood.

Roentgenograms: Plain films of the skull showed evidence of increased intracranial pressure in 10 cases. In five there was evidence of chronic mastoid infection; in two of these the patients gave no history of otitis, whereas one patient with otitis had normal mastoids in the films. In all but two patients pneumencephalograms were made. One of the two showed normal ventricles by ventricular estimation. In 12 of the 14 cases in which air studies were made the air was injected directly into the ventricles. In six cases ventriculography was unsatisfactory and was followed by encephalography. Two had encephalography only. The reason for the primary air injection directly into the ventricles was the presence of papilledema. The evidence obtained from the study of the pneumoroentgenograms was almost uniformly of a ventricular system normal in size, shape, and position. In a few cases, indeed, the ventricular system appeared to be distinctly smaller than in the normal case (see figure 2).

A number of interesting points arose in association with these air studies: first, the fact that so high a percentage failed to show satisfactory filling on direct ventriculography. This is to be explained by the small size of the ventricles and the high intracranial pressure. This combination we believe resulted in expulsion of the gas along the needle tract when ventriculography was used. As evidence of this mechanism we found, in some, air along the tract; in many, a filling of the cerebral sulci and subarachnoid cisterns with gas which was primarily introduced into the ventricles, indicating its escape to these locations.

Treatment

Thirteen of the 15 patients were treated by subtemporal decompression. One, a child, showed some ataxia on clinical examination, and underwent a suboccipital exploration and decompression; one had no operation whatever. In addition, the patients were treated by dehydration measures, consisting of limitation of fluid intake, saline cathartics or retention enemas, and intravenous hypertonic dextrose solution when indicated.

Results: All of the patients improved during their stay in the hospital. This was evidenced by the disappearance of headache, partial recession of the papilledema, and improvement or arrest of the failing vision. After leaving the hospital, they were followed for various periods of time from a few months to several years. The dehydration measures were continued at home, and improvement continued after the discharge, but final disappearance of the papilledema required a period of time from six months to several years, with occasional recurrence of headache.

One patient, three months after discharge from the hospital, died of another cause while at home. The brain specimen was obtained, and examination, as in so many of the cases reported in the literature, showed no indication of inflammatory disease. Pericellular and perivascular spaces occurred, which may have been interpreted as edema, but this was uncertain, since the fixation of the specimen

was not perfect and the spaces may have represented post-mortem shrinkage.

Comment

One of the most difficult aspects of the syndrome presented by these patients is to find an appropriate name to describe it. Serous meningitis is obviously not entirely satisfactory, since we are clearly not dealing with an inflammatory disease unless it be a sympathetic response of the choroid plexuses to inflammation elsewhere in the body. The name "otitic hydrocephalus" recently proposed by Symonds is inept for two reasons: first, that the majority of our cases have no history or other evidence of otitis media; and second, that by means of air studies—which Symonds did not make in the three cases which he reported—no evidence of internal hydrocephalus was present. We believe a more appropriate name for the syndrome represented by the cases herein reported is *hypertensive meningeal hydrops,* which has been partially suggested by Passot, who spoke of meningeal hydrops and the hypertensive meningeal state. This eliminates the suggestion that the syndrome is due to an infectious intracranial disease. It indicates the common factors of increased pressure of the cerebrospinal fluid, its watery nature (no increase of cells or protein), and its location primarily in the meningeal spaces.

In the differential diagnosis a tumor or other localized disease, such as adhesive arachnoiditis, often cannot be excluded without pneumencephalography. The characteristics to be noted in the examination of the pneumencephalograms are: first, a normal ventricular system as regards size, shape, and position; second, difficulty in filling the ventricles by ventriculography, and the escape of the gas during ventriculography into the subarachnoid cisterns and sulci.

In the treatment of these cases, we believe that a subtemporal decompression while not essential is very important. This is especially true if the elevation of the optic discs is great and the patient's vision is threatened. By the decompression, a reduction in the intracranial tension is at once brought about. If this does not prove to be adequate, further reduction in pressure can be accomplished by repeated lumbar punctures and the dehydration methods already described. In this further treatment, the decompression also plays an important role, since the degree of bulging and tension of the area of decompression acts as a barometer for the state of intracranial tension and thus serves as a guide for other therapy.

The prognosis is uniformly good, although the cure does not come about very rapidly. It is our impression that it takes many months and maybe even years before a normal equilibrium between the production and absorption of the cerebrospinal fluid is established.

706 West One Hundred Sixty-eighth Street.

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AN UNUSUAL RECOVERY FROM THE ENDOPHTHALMITIS OF MENINGOCOCCUS MENINGITIS

Report of a case*

N. K. Lazar, M.D.
Chicago

In 1936, I† reported on the early ocular complications of epidemic meningitis. The present report is of a case kept under observation for the past nine months, showing the late complications of epidemic meningitis, and with results somewhat surprising but entirely welcome.

On May 11, 1936, Mr. M. L., white, 24 years of age, was found unconscious in his room. As nearly as could be ascertained he had been unconscious for at least 24 hours. At the hospital a diagnosis of epidemic meningitis was made and treatment instituted. In the course of the general physical examination, it was noted that the right eye was a little red and no red reflex was obtainable. The fundus of the left eye was normal. A few days later it was noted that both ears had become involved. The patient could not hear. Intraspinous injections of anti-meningococcus serum were given daily in varying amounts—30 to 40 c.c. for two weeks. There was marked improvement at the end of the first week, but at the end of the second week (May 25, 1936), the patient again become semicomatose and showed anuria and a blurred left disc.

On May 25th, I saw the patient for the first time. He was semicomatose and could be aroused at times. The right eye showed only moderate circumcorneal injection. The cornea was clear; the anterior chamber a little hazy. The iris was free, however, and there were no synechiae. The lens was normal. No fundus reflex could be obtained, but behind the lens a mass could be seen that was light in color. The left eye showed a little blurring of the margins of the disc. No exudate nor hemorrhages were present. A diagnosis was made of endophthalmitis in the right eye and a beginning choked disc in the left. An attempt to give the patient intravenous antitoxin had to be abandoned, for he appeared sensitive to the antitoxin. After catheterization and supportive treatment, the patient steadily improved, and a few days later a more detailed examination of both eyes was made.

Vision in the right eye was light perception and projection in all directions. All the ocular muscles were normal. Moderate circumcorneal injection was still present. The anterior chamber was not so hazy as before. There was no fundus reflex, but a brownish-gray mass was discernible behind the lens. On tactile tension the eye appeared softer than the left eye. The left eye showed apparently good vision for distance and normal vision for near. The extraocular muscles were normal; the cornea, iris, and media were normal. The disc was definitely choked, with an elevation of about one-and-one-half to two diopters.

Treatment for the right eye consisted of atropine instilled into the eye three times daily. Heat was applied four times daily by an infra-red lamp. The general condition of the patient improved slowly, but steadily, and he was discharged from the hospital eight weeks after the onset. Examination of both eyes at this time gave the following results: The right eye could see fingers at five inches. There

* From the Department of Ophthalmology, Northwestern Medical School.

† Lazar. Arch. of Ophth., 1936, v. 16, p. 847.

was no circumcorneal injection. The anterior chamber was clear. The lens was normal. There was a light-red reflex present, but details as to disc or vessels of the fundus could not be made out. The entire vitreous had large floating opacities. The left eye was normal in all respects, and vision was 20/20.

The patient was seen weekly for the next two months, and vision continued to show improvement at every visit. The media were clearing and strands of connective tissue were seen to form on the temporal side of the disc running into the vitreous. The disc showed some paling with much connective tissue around it. The patient had been using atropine 1 percent until three months ago. The heat to the eye was discontinued about five months ago.

At the last examination in February, 1937, vision in the right eye was 20/50 corrected. Fixation is normal. The fundus shows a proliferative retinitis (fig. 1). No other signs of the endophthalmitis are present. The left eye is normal.

The spinal-fluid examination from entrance to the hospital until June 11, 1936, showed a steady decrease in the number of cells from 18,400 to normal. The organisms disappeared from the spinal fluid after the first week. The urine showed albumin from the time cystitis developed for several months. The blood and spinal Wassermann tests were negative.

In retrospect, we were dealing with a severe meningococcemia, with complicating endophthalmitis and complete loss of hearing, neither of which was influenced by the treatment. In my report before the section last May I pointed out that once an eye has become involved, no type of treatment seemed to alter the course of the disease. However, in that series the conclusion was drawn that of the cases that were treated with the antitoxin, few developed endophthalmitis, and those that did showed some degree of regression. I believe this to be true. In the case just reported, since no antitoxin was used, and no intravenous medication was given, any inference as to the effect of treatment would not be justifiable. I do not believe that the atropine, heat, or the serum given intraspinally had any influence on the regressive changes in the right eye.

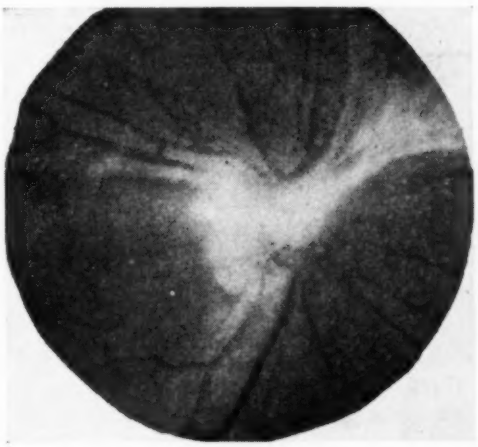


Fig. 1 (Lazar). Fundus after recovery.

55 East Washington Street.

A VISUAL-ACUITY SURVEY: REPORT OF 721 CASES*

CLARENCE W. RAINEY, M.D.
Chicago

Since the publication by the American Medical Association,[1] in 1925, of a standard method of appraisal of loss of visual efficiency, there has been no clinical report of a visual-efficiency survey using the percentage method. I wish to submit herewith the results of such a survey of 721 men between 20 and 75 years of age, in which the percentage method was employed.

A preliminary survey of about 15,000 men was made by a field force of physicians familiar with the American Medical Association rating. Of these 15,000 men, approximately 2,100 (14 percent) were found with vision less than 100 percent in one or both eyes, for distance or near, even with the aid of their present glasses, or with some external disease of the eye requiring further study. Seven hundred and twenty-one, or approximately one third of these, were chosen at random for this study. The data presented in the following tables and charts are the result of the writer's examination of this group.

The office routine consisted of the following procedures: A brief history was taken; the present glasses were neutralized; the vision for distance and near was recorded with and without aid of the present glasses; the color vision was tested by means of the Ishihara method,[2] each eye being tested separately.[3] The eyes were examined externally by inspection, palpation, and the cover test. An intraocular examination was made with the aid of an ophthalmoscope. If there was no contraindication, instillations of one drop of a solution of 4-percent homatropine and 2-percent cocaine were made in each eye at 10-minute intervals, for a total of six instillations. One-half hour after the last drop, skiascopic measurements were made with the use of spheres and cylinders, and the rotary trial as described by Lindner[4] and Kramer.[5] The measurements were proved at the trial case. A note was made of the condition of the media and fundi. The presence of glaucomatous cupping of the disc was especially kept in mind. In doubtful cases the tension was measured with the new Schiötz tonometer (1926), after the instillation of a 2-percent solution of butyn. The width of the dilated pupil was noted. Four days later a postcycloplegic test was performed, and lenses were ordered, if necessary. The patient returned from the optician with his spectacles, and the lenses were neutralized and the frames inspected in every case.

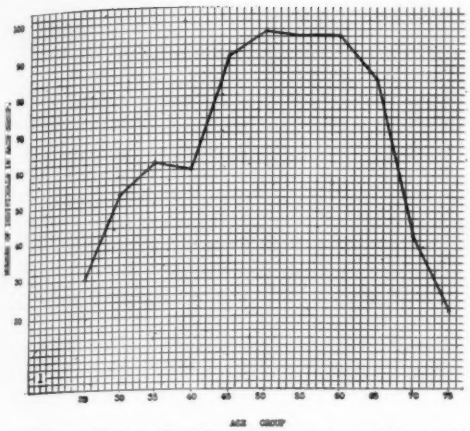
Visual-field examinations were made made when indicated, by means of the Ferree-Rand perimeter.[6] Tangent-curtain tests were made,[7] using 3 mm., 2 mm., and 1 mm. white test objects on a black background.[8]

In certain cases with high corrections such as high myopia, mixed astigmatism, and hypermetropia and astigmatism, atropine was used to check the results obtained by the use of homatropine. In these cases four drops of a 0.5-percent solution were used daily for three days, and skiascopy repeated. Often the results varied considerably from the findings obtained with the use of homatropine.

RESULTS

Figure 1 shows the distribution of patients according to five-year age groups. Figure 2 shows the average uncorrected vision of the two eyes, for distance and for near.

* Read before the Chicago Ophthalmological Society, February 15, 1937.



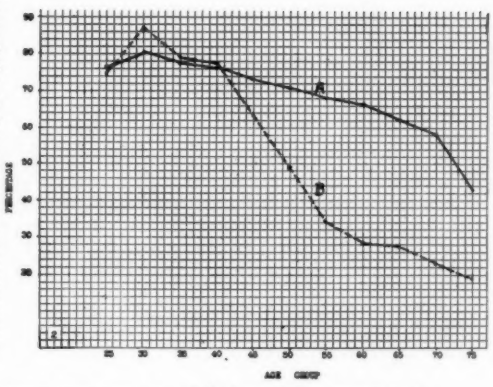


Fig. 1 (Rainey). Distribution according to 5-year age groups of 721 patients examined.
Fig. 2 (Rainey). Loss of vision with increasing age (average of both eyes). A = distance vision; B = near vision.

The 721 patients were divided into three groups. Group 1 included 429 persons (59.5 percent) who were essentially normal except for the error of refraction. Their vision was brought up to 100 percent for distance and for near, after refraction. Group 2 consisted of 107 individuals (14.8 percent) without any detectable pathological condition of the eyes. Their vision was subnormal in one or both eyes after refraction. This group contained the patients with amblyopic eyes (amblyopia ex anopsia). Group 3 included 185 patients (25.7 percent) whose vision could not be brought up to normal because of some abnormal condition of the eyes.

In table 1 are given the results obtained by testing the patients included in group 1. Fourteen individuals in the 17-25 age

TABLE 1
GROUP 1

VISION NORMAL[1] (100 PERCENT) AFTER REFRACTION. 429 INDIVIDUALS. TOTAL YEARS, 20,501. AVERAGE AGE 47.79 YEARS.

Age in 5-year groups	No. in group tested for dist.	Unaided Vision (%)				No. in group tested for near
		Distance		Near		
		Right	Left	Right	Left	
17–25	14	1101 78.64	991 70.79	1360 97.15	1340 95.71	14
26–30	35	3004 85.83	2798 79.94	3285 93.86	3220 92.00	35
31–35	36	2989 83.02	2961 82.25	3192 88.66	3160 87.77	36
36–40	34	2597 76.38	2793 82.15	2898 85.25	2762 81.12	34
41–45	53	4165 78.15	4326 81.64	3409 64.32	3674 69.32	53
46–50	67	5148 76.84	5095 76.04	3307 49.36	3443 51.39	67
51–55	62	4816 77.67	4688 75.56	2331 37.60	2636 42.51	62
56–60	58	4176 72.00	4093 70.57	1700 29.31	1832 31.59	58
61–65	42	3062 72.90	2889 68.80	1387 33.02	1460 34.76	42
66–70	20	1314 65.70	1395 69.75	494 24.70	603 30.15	20
71–75	8	432 54.00	328 41.00	112 14.00	176 22.00	8
Totals	429	32804	32357	23475	24306	429,
Averages 47.79 yrs.		76.46%	75.42%	54.72%	56.64%	

TABLE 2

GROUP 2

VISION SUBNORMAL AFTER REFRACTION—AMBLYOPIC GROUP 107 INDIVIDUALS. TOTAL YEARS 4490. AVERAGE AGE 41.96 YEARS

Age in 5-yr. groups	No. in group tested for dist.	Unaided Vision (%)				Vision with Glasses (%)				No. in group tested for near
		Distance		Near		Distance		Near		
		Right	Left	Right	Left	Right	Left	Right	Left	
19–25	8	457 57.13	725 90.62	381 54.42	627 89.55	665 83.12	779 97.36	573 81.86	678 96.86	7
26–30	15	980 65.33	1243 82.87	1037 74.07	1172 83.71	1311 87.40	1416 94.44	1217 86.92	1304 93.14	14
31–35	14	977 69.07	928 66.29	1030 79.24	912 70.16	1256 89.71	1149 82.07	1218 93.69	1062 81.69	13
36–40	17	1273 74.29	1146 67.41	1195 70.29	1150 67.65	1504 88.47	1443 84.88	1408 82.82	1441 84.77	17
41–45	16	890 55.62	1105 69.06	847 52.94	911 56.94	1341 83.81	1354 84.62	1363 85.12	1369 85.56	16
46–50	9	491 54.55	608 67.55	387 43.00	470 52.22	824 91.55	854 94.89	834 92.66	869 96.55	9
51–55	6	310 51.66	350 58.33	134 22.33	146 24.33	568 94.66	576 96.00	558 93.00	562 93.66	6
56–60	9	500 55.55	478 53.10	227 25.22	337 36.33	827 91.88	807 89.66	820 91.11	808 88.66	6
61–68	13	751 57.77	599 46.07	520 40.00	444 34.15	1222 94.00	1120 86.15	1122 86.31	1030 79.25	13
Totals	107	6629	7182	5758	6169	9518	9498	9113	9123	101
Averages 41.96 yrs.		61.95%	67.12%	57.01%	61.07%	88.95%	88.78%	90.13%	90.31%	

TABLE 3

GROUP 3

VISION SUBNORMAL AFTER REFRACTION. ABNORMALITIES PRESENT 185 INDIVIDUALS. TOTAL YEARS 9,691. AVERAGE AGE 52.37 YEARS

Age in 5-yr. groups	No. in group tested dist.	Unaided Vision (%)				Vision with Glasses (%)				No. in group tested near
		Distance		Near		Distance		Near		
		Right	Left	Right	Left	Right	Left	Right	Left	
21–25	8	731 91.22	565 70.53	432 86.40	351 70.20	796 99.44	712 89.00	476 95.20	401 80.20	5
26–30	3	252 84.00	252 84.00	254 84.66	276 92.00	261 87.00	284 94.66	261 87.00	284 94.66	3
31–35	12	993 82.75	851 70.91	811 81.10	729 72.90	1119 93.25	953 79.41	921 92.10	804 80.40	10
36–40	9	602 67.44	727 80.77	624 78.00	647 80.88	813 90.33	841 93.44	751 92.12	742 92.75	8
41–45	22	1462 66.45	1460 66.36	1132 56.60	1113 55.65	1673 76.04	1693 76.95	1573 78.65	1505 75.25	20
46–50	21	1175 55.95	1290 61.42	947 52.61	792 42.90	1670 79.52	1658 79.00	1391 77.28	1461 77.28	18
51–55	28	1503 53.68	1380 49.30	655 25.19	645 24.81	2523 90.03	2442 87.22	2323 89.34	2242 86.23	26
56–60	29	1764 60.82	1776 61.24	778 32.41	816 33.75	2311 79.70	2323 80.70	1937 80.71	1965 81.87	24
61–65	19	986 51.89	925 48.68	401 23.40	311 17.27	1482 82.33	1429 79.39	1386 81.53	1345 78.86	18
66–70	21	892 42.41	1171 55.76	388 22.80	404 23.76	1635 78.85	1819 86.61	1288 75.77	1467 86.30	17
71–75	13	495 38.08	569 43.77	255 36.43	260 28.88	913 70.23	1098 84.45	616 68.46	792 88.00	9
Totals	185	10855	10966	6677	6344	15196	15252	12923	13008	158
Averages 52.37 yrs.		58.06%	59.20%	42.40%	40.10%	82.10%	82.40%	81.10%	82.30%	

group scored 1,101 for distance out of a possible 1,400 for the right eye; the average was 78.6. Four hundred and twenty-nine individuals scored 32,804 for the right eye. On a basis of a possible 42,900, an average of 76.49 percent for the whole group was obtained. The average age (47.79 years) was obtained by dividing the total number of years lived by all, or 20,501, by 429.

The same plan was used in constructing tables 2 and 3, and in obtaining their totals and averages.

Table 4 is a summary of the averages of the three groups. The vision of the right and left eyes was averaged. The presence of amblyopia and pathological conditions reduced the total efficiency of the whole group 5.5 percent. (See table 4.)

TABLE 5

IMPROVEMENT WITH NEW GLASSES (HOMATROPINE METHOD) OVER OLD GLASSES (MANIFEST METHOD) 273 INDIVIDUALS, 74 OF WHOM WERE AMBLYOPIC

	Average Distance Vision (R and L)	Average Near Vision (R and L)
With new glasses homatropine method	97.5	97.5
With old glasses manifest method	83.7	80.1
Average improvement homatropine method	13.8	17.4

The pathological conditions of the eye noted in group 3 are enumerated below.

TABLE 4

SUMMARY OF AVERAGES

Group	Number Tested	Average Age	Average Distance Vision of Both Eyes	Average Near Vision of Both Eyes	Average Distance Vision with Correction	Average Near Vision with Correction	Gain for Distance	Gain for Near
1	429	47.8	75.9	55.6	100.0	100.0	24.1	44.4
2	107	42.0	64.6	59.6	88.8	90.2	35.4	40.4
3	185	52.4	58.6	41.2	82.3	81.7	41.4	58.8
Whole Group	721	48.1	69.9	50.8	94.5	94.5	24.6	44.5

A comparison was made between the old and new glasses worn by 273 individuals, 74 of whom were amblyopic. Almost without exception the old glasses had been prescribed on the basis of the manifest method. Without exception the new glasses were prescribed after an examination by the homatropine method.

A detailed examination of the glasses worn by each individual disclosed very marked differences between the amount of the sphere, cylinder and axis position of the cylinder, and the spherical addition for near in the old glasses as compared with the new. The results are shown in table 5.

Many of these conditions could not have been adequately studied or diagnosed through undilated pupils. A number of these conditions necessitated further study and appropriate treatment by a physician. Many of the conditions had been present at the time of first employment but were not disclosed until the time of this survey.

External diseases: Exophthalmos, 1; old trauma, 7; intraocular foreign body, 2; phthisis bulbi, 1; absent eyeball, 1; nystagmus, 1; muscle palsy and diplopia, 3; ptosis, 1; squint, 10; band-shaped keratitis, 11; interstitial keratitis, 8; keratoconus, 8; pterygium and irregular astigmatism, 1.

Internal diseases: Argyll Robertson

pupil, 4; iritis, acute, 1; hole in iris, 1; adherent leucoma, 1; iris bombé, 1; incipient cataract, 51; aphakia, 3; fluid vitreous, vitreous floaters, 5; old choked disc

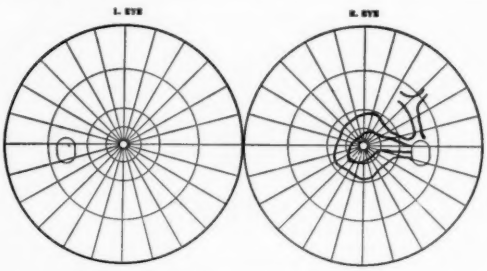


Fig. 3 (Rainey). Central fields in case 1; red glass before left eye; 5-mm. red test object. Inner line recorded without pressure about neck; outer, with 40 mm. Hg pressure about neck. Angioscotoma, right eye.

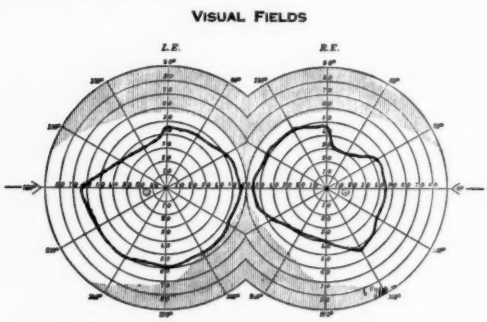


Fig. 4 (Rainey). Peripheral fields in case 2, August 19, 1936; 1-mm. white test object; preëxposure card method, Ferree-Rand perimeter. Pituitary tumor.

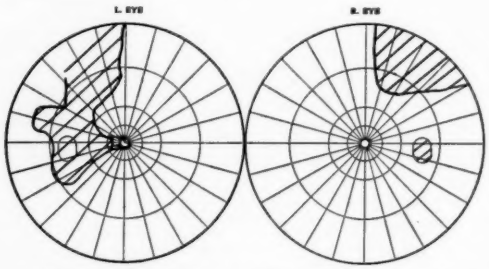


Fig. 5 (Rainey). Central fields in case 2, August 29, 1936; 6-mm. white test object. Color vision normal.

and secondary optic atrophy, 12; acute choked disc, 1; simple optic atrophy, 27; coloboma of the choroid, 1; retrobulbar neuritis, tobacco, etc., 5; hemorrhagic retinitis, 3; detachment of the retina, 1; central macular choroiditis and choroid atrophy, 13; high myopia, 4; glaucoma, 12; chronic dacryocystitis, 1. Vascular changes were noted in many cases.

In no case was an attack of acute glaucoma noted after the use of homatropine. In several cases, however, the intraocular tension rose above the normal of 32 mm. Hg, permitting the diagnosis of a glaucomatous tendency in eyes showing no cupping of the disc.

Discussion

The 429 individuals in group 1 presented no particular problems. The 107 patients included in group 2 presented some interesting problems. In this group the poor vision was often found to be due to a central scotoma that could be demonstrated by the use of the tangent curtain and a 1-mm. or 2-mm. test object, at one or two meters' distance with illumination of 10 foot-candles. The characteristic clinical finding of eccentric fixation was especially noticeable in this group.[9] Two illustrative cases are given.

Case 1. Jean B., aged 34 years, complained of poor vision in the right eye, of many years' duration, especially for near. The right vision was 20/40, not improved after refraction. The left vision was 20/20, improved somewhat by a small correction for hypermetropia and astigmatism. The media and fundi were normal except for many discrete spots on each retina (Tay's choroiditis). No glasses were ordered.

A red glass was placed before the left eye and the patient was tested by means of the tangent curtain, at a distance of one meter, with good daylight. A scotoma was marked out for the right eye with a 5-mm. red test object. The scotoma extended from the blind spot to envelop the point of fixation. When a blood-pressure machine was placed about the neck and the pres-

sure raised to 40 mm. of mercury the patient exclaimed that the vision diminished. The scotoma was enlarged. It returned to the previous size when the pressure was released. A diagnosis of angioscotoma was made (see figure 3).

Case 2. John W., aged 48 years, had obtained glasses from an optometrist nine months previously. He stated that he saw only the right half of objects and printed words with his left eye. He had no headaches nor other symptoms. He stated that the hair on his body had always been sparse as compared with that of other men. The right vision was 20/20. A small amount of hypermetropia and astigmatism was discovered after refraction. The left vision was 20/40. Upon skiascopy there was a small amount of hypermetropia and astigmatism, but the vision was not improved by lenses. There was pallor of both discs, especially of the left. When the tests for near were made the patient stated that he saw the right half of the words with his left eye. Visual-field studies disclosed the presence of temporal-field losses. On the X-ray film, destruction of the anterior clinoid processes and floor of the sella turcica were noted.

A diagnosis was made of probable chromophobe adenoma of the pituitary body (see figures 4 and 5).

Conclusions

1. Because the visual efficiency rapidly decreases with age, due to the loss of accommodation and the prevalence of subnormal and abnormal conditions of the eyes, the need for periodic visual-efficiency examinations at one- to two-year intervals is apparent.

2. Homatropine (4 percent) with cocaine (2 percent) can be used conveniently in determining the refractive state of the eyes at any age, without risk of inducing acute glaucoma.

3. The use of 0.5-percent atropine solution, four drops a day for four days, is recommended to supplement the effect of homatropine in cases of high refractive error.

4. Cylinder skiascopy, including the rotatory trial, was especially useful in groups 2 and 3, for patients whose vision could not be brought to normal and who were often unable to help in the subjective tests at the trial case.

5. The manifest method of refraction is inadequate and inefficient as compared with the method using clycoplegia.

6. The visual efficiency of each of the three groups could be increased by refraction and spectacles. The efficiency of the whole group was raised approximately 25 percent for distance and 45 percent for near. The gain of the group already wearing spectacles was 14 percent for distance and 17 percent for near.

7. The tests for color blindness were an aid to diagnosis.

8. The ophthalmologist best serves the interests of the employee and employer.

9. The Standard Method of Appraisal of Loss of Vision should be used as the basis of all group examinations.

10. Examinations of the visual fields with the tangent curtain should be made in all cases in which the vision is not normal after refraction has been corrected.

8 South Michigan Avenue.

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PLASTIC REPAIR OF LID HERNIA WITH FASCIA LATA*

BARNET R. SAKLER, M.D.
Cincinnati

Bagginess of the lower lids may be due to herniation of intraorbital fat. A review of the literature reveals that very little has been written on this subject. Schmidt-Rimpler of Marburg,[1] in 1899, reported a case of intraorbital-fat hernia in the upper lids of a young girl of 19. This condition of apparent blepharochalasis had been present since early childhood, gradually increasing in size. At operation a fatty mass was found to be continuous with the intraorbital fat, presenting through a deficient orbital fascial septum. The presenting fat was removed and an elliptical portion of the redundant skin excised before closure. In conclusion Schmidt-Rimpler noted that a similar condition was often present in cases of ptosis adiposa seen in older people where the fascial septum had atrophied with the development of a defect and a resultant herniation of intraorbital fat.

One should differentiate between the conditions known as blepharochalasis and ptosis adiposa. Blepharochalasis is a rare condition of thinning and wrinkling of the skin, limited to the upper lids. It was first named by E. Fuchs in 1896.[2] Most commonly seen in young and middle-aged females it is characterized by recurrent attacks of painless edema and redness, finally resulting in an atrophy of the intercellular layers of the skin. The skin assumes a tissue-paper thinness and hangs in folds (pseudoptosis). The etiology is unknown. Fuchs and Röhmer believed it to be on an angioneurotic basis. Ptosis adiposa (Sichel) is a condition, involving both the upper and lower lids, that is seen in elderly people. It is characterized by a wrinkling of the skin, resulting in pseudoptosis and baggy lower lids. The term is a misnomer since there is no deposition of fat. The condition is due to a senile relaxation of the fascial bands connecting the skin with the palpebral musculature and the orbital rim (Hotz).

The anatomical structures of the lids are separated by Whitnall[3] into four

* From the Eye Service of the Illinois Eye and Ear Infirmary, Dr. Harry S. Gradle, Chief of Staff.

planes as follows: 1. skin, 2. muscular (orbicularis oculi), 3. fibrous (septum orbitale; tarsus), 4. palpebral conjunctiva.

The septum orbitale (fascia tarso-orbitalis) is a fibroelastic, connective-tissue membrane directly beneath the palpebral portion of the orbicularis oculi. It is attached to the circumference of the orbital margin above and the tarsus below, separating the structures in the retro-orbital space from the lids. In the lower lid the orbital septum blends with the anterior surface of the tarsal plate. In the upper lid the fascia is separated from the upper convex margin of the tarsal plate by the cutaneous fibers of the levator palpebrae superioris.

The procedures used in the treatment of baggy lids are often complicated by the development of cicatricial ectropion, keloid formation, or fat herniations through the lips of the skin wound.[4] The method to be described tends to deter the development of these complications and at the same time prevent any recurrence. The technique involves the dissection and excision of the fatty mass and the repair of the fascial defect by the reconstruction of the orbital septum with a fascia-lata transplant. It was thought that the redundant skin and subcutaneous tissue would be pegged down by the proliferation of the connective-tissue processes and slight shrinkage of the fascial transplant.[5]

Technique

Anesthesia is obtained by: 1. Five instillations of 2-percent butyn into the conjunctival sac at two-minute intervals.

2. Subcutaneous and peritarsal infiltration with 2-percent novocaine and 1:1000 adrenalin (gtts. viii to oz. 1) extending from the outer to the inner canthus. A small amount of solution is injected under the periosteum of the infraorbital margin.

3. Superficial infiltration of the skin along the line of incision, 4 mm. from the lid margin.

A horn plate is inserted beneath the lower lid by an assistant. A horizontal incision is made through the skin and attenuated orbicularis, 4 mm. from the lid margin. Traction-fixation sutures are now placed. One mattress silk suture is inserted through the skin and subcutaneous tissue of the upper lip of the wound at its center. This suture is held by a small hemostat. Three silk sutures are inserted through the lower lip of the wound at its inner, central, and outer portions. Traction on these fixation sutures allows a good exposure of the protruding fat. With a blunt curved Stevens muscle scissors the fatty mass is dissected free from the skin and fibers of the orbicularis anteriorly, and the retroörbital fat posteriorly. In the excision of the fat, only that portion is removed that is presenting above the glistening white periosteum of the infraorbital margin. Care should be exercised not to exert any undue pull on the fatty tissue, or the bright-yellow intraorbital fat will prolapse into the wound. The resection of the fat hernia is facilitated by the use of smooth curved Kelly forceps, bisecting the mass and then dissecting it free from the center towards either end. Bleeding is controlled by fine catgut ligatures. Oozing is stopped by pressure. Absolute hemostasis is essential.

The fascial transplant is obtained by making a three-inch incision through the skin, subcutaneous fascia, and fat on the lateral aspect of the thigh, at the junction of the upper and middle one third. One strip of fascia lata about 5 x 2 cm. is excised and placed in warm saline. The subcutaneous fat and fascia are closed with a continuous no.-1 plain catgut suture. Skin edges are approximated with interrupted fine-silk sutures. A gauze

dressing is held in place by strips of adhesive. Skin sutures are removed in seven days.

The fascial transplant is carefully cleansed of fat tags with scissors. It is then bisected lengthwise into two strips, each measuring about 5 x 1 cm. and trimmed to fit the space between the periosteum of the infraorbital margin and

Figs. 1-5 (Sakler). Figure 1 shows the right eye before operation. The succeeding illustrations show the condition two weeks, and two, three, and four months after the operation, respectively. The left eye was operated on three weeks after the right eye.

the convex border of the tarsus, loosely, without tension. The fascial implant is then sutured to the inner surface edge of the infraorbital periosteum below, and the distal convex margin of the tarsal tissue above, extending from inner to outer canthus. (Interrupted 20-day, 000-chromic-catgut sutures on a small curved round needle are used.) The traction sutures are removed. The skin incision is closed with multiple interrupted fine-silk sutures. Bichloride ointment 1:3000 is put into the conjunctival sac, and a pressure bandage applied. The first dressing is made in 24 hours. The skin sutures are removed in four days.

Case Report

A colored male, L. H., age 65 years, having bilateral chronic glaucoma simplex, was seen in the outpatient clinic on the service of Dr. T. D. Allen. Our attention was attracted to the marked bagginess of the lower lids. The pseudoptosis present was not very marked. This condition of the lids had been present for many years. During the past few years the lower lids had been very slowly increasing in size. A diagnosis of intraorbital fat hernia in the lower lids was made, which was confirmed at operation. Examination of the excised fat by Dr. Georgiana Theobald showed its structure to be normal. It was decided to operate on each eye separately. At operation on the lower right lid a T-shaped skin incision was made. The postoperative course was uneventful. Healing of the lid wound resulted in a vertical ridge. This was attributed to the type of incision employed; however, examination of the patient two months later showed only a very slight vertical furrow present. Three weeks after the right lid was operated on, surgery on the lower left lid was undertaken, a horizontal skin incision being made. The postoperative course was uneventful and the cosmetic result good.

Conclusion

1. A procedure is reported for the plastic repair of baggy lower lids due to intraorbital fat hernia.

2. The use of fascia-lata transplant forms a new orbital septum, anatomically placed and physiologically correct, giving good cosmetic result.

Doctor's Building.

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SOME RESULTS OF INTRANASAL DACRYOCYSTORHINOSTOMY*

THEODORE E. WALSH, M.D. AND LOUIS BOTHMAN, M.D.
Chicago

Platner[1] in the first part of the eighteenth century was the first to perform a surgical operation on the tear sac; Berlin[1] in 1868 was the first to remove the sac. The first operations were done for relief of the secretion and discharge into the conjunctival sac with little thought for relief from tearing. Other workers perfected the dacryocystectomy that was popularized by Axenfeld[2] in 1902. This operation has been the choice of most ophthalmologists for the relief of infected lacrimal sacs since that time. To correct the tearing that persists after the removal of the sac some authors have advised surgery on the lacrimal gland.

Toti[3] in 1904 introduced his method of tear-sac surgery for the relief of tearing. Many others have modified his procedure of reëstablishing the normal flow of tears via the external route. Professor Arruga[4] demonstrated his modification when in Chicago recently. All of these methods leave a scar and may even produce a peridacryocystitis or a cellulitis.

Caldwell[5] in 1893 was the first to attempt the intranasal approach to the tear sac. The operation was perfected by West[6] and Polyak[7] and has become popular with the rhinologist. Many authors have reported modifications with their results. Bookwalter[8] in 1920 published his modification with the results of 55 operations. His technique has been followed in the present series as well as his advice in the aftercare of patients.

In no cases brought to operation were there obstructed puncta and canaliculi; the obstruction was in the lower end of the sac.

The data in this small series are presented to show the good results obtained by the intranasal operation with relief from tearing as well as from discharge and secretion. The absence of any scar appeals to some patients, particularly to women, many of whom will permit an intranasal operation but would not submit to an operation by the external route.

Nineteen patients are included in this series, 12 females and seven males, whose average age was 44.5 years. The extremes were 13 and 72 years. Twenty-one tear sacs were operated on. The average duration of symptoms was for 28.9 months. Twelve patients had had at least one attack of acute dacryocystitis.

All of the 21 had lacrimation and 20 had visible secretion in the conjunctival sacs. Eighteen of the 21 sacs were distended. From all but one pus could be expressed by pressure over the sacs. In no case would the fluid used in irrigating the sac flow into the nose. It always returned through the upper punctum.

Previous treatment (that is, before admission to the Eye Clinic) had been probing in 10 cases and irrigations in 12. Three patients had complications from probings.

There had been injuries to the nose in four cases. Two were from auto accidents, and one patient had had a fractured nose four years before admission. Nine patients had been operated on before admission. Three had had abscesses incised for drainage and four had slit lower puncta and lacrimal canals. In one case the sac

* From the Divisions of Otolaryngology and Ophthalmology, Department of Surgery, University of Chicago. Read before The Chicago Ophthalmological Society, April 19, 1937.

TABLE 1

DATA ON 21 CASES OF INTRANASAL DACRYOCYSTORHINOSTOMY

No.	Unit No.	Sex	Age	Eye	Vision	Onset Mos. Ago	Acute Dacryocys.	No. of Attacks	Tearing	Secretion	Swollen Sac	Secr. Expressed	Irrigation	Prescription and Operation Elsewhere: Treatment: Probing	Irrigation	Complication	Previous Injury	Previous Oper.	Type of Operation	Date of Oper.	Date last visit	Results: Condition of nose	Tearing	Secretion	Sac	Remarks
1	1261	F	36	R	1.0−2	48	+	1	+	+	+	+	0	+	+	0	0	+	Drained abscess	1/29/37	3/16/37	Well	0	0	0	
2	14004	F	31	R	0.8+1	1	+	+++	+	+	0	+	0	+	+	0	0	+	Slit lower punct. 1917	8/12/35	10/26/35	Well	+	0	0	Slit punctum
3	27322	M	50	R	1.5−3	3	0	−	+	0	0	0	0	0	0	0	0	0	—	9/10/35	10/22/35	Well	0	0	0	Hem. 2 days after operation
4	58162	F	53	R	1.0+2	12	+	2	+	+	+	+	0	0	0	0	0	0	—	1/ 4/37	4/ 7/37	+	0	0	0	Acute attack, temp. 101° 12/22/36; granulations 4/5/37, now being treated
5	72497	F	48	L	0.8	8	+	++	+	+	0	+	0	+	+	0	0	+	28 yrs. ago; 23 yrs. ago	6/13/34	7/ 9/35	Well	0	0	0	
6	82979	M	51	L	1.2−1	7	+	1	+	+	+	+	0	+	+	0	0	+	Punct. slit 2 mos.	4/26/35	6/19/35	Well	0	0	0	
7	85015	F	48	R	1.2−1	48	0	−	+	+	+	+	0	0	0	0	0	0	—	8/14/35	10/ 5/35	Well	0	0	0	
8	114103	F	42	L	1.2	12	0	1	+	+	+	+	0	0	0	0	0	0	—	10/22/34 1/ 9/35	7/29/36	Well	0	0	0	Nasal opening partially closed; reop. 2½ months later
9	115443	M	13	R	0.8−1	1.5	0	0	+	+	+	+	0	0	0	0	+	0	—	Ext. oper. 8/5/35 R sac removed 11/27/35			+	+		Fractured maxilla, auto accident, failure
10	116417	F	19	R	1.5−4	84	+	2	+	+	+	+	0	+	+	0	+	+	Incision of abscess 2x	1/28/35	4/ 5/35	Well	0	0	0	Fistulous tract removed 12/22/34; accident, 1926
11	117048	M	52	L	0.6−3	48	0	0	+	+	+	+	0	0	0	0	0	0	—	11/25/34	12/15/35	Well	0	0	0	
12	119020	F	35	L	0.6+3	12	0	0	+	+	+	+	0	0	0	0	0	0	—	2/15/35	9/26/35	Well	0	0	0	Fistula from old sac oper. Skin abscess over sac drained—Well since
13	122972	M	17	R	1.5−3	36	0	0	+	+	+	+	0	0	0	0	0	+	Sac removed, '33	7/18/35	6/ 1/36	Well	0	0	0	
14	131313	M	41	L	0.4	12	+	++	+	+	+	+	0	+	+		0	+	Punct. slit 1 wk. ago	9/11/35	10/ 5/35	Well	0	0	0	
15	134381	F	62	R	0.6	48	+	++	+	+	+	+	0	+	+	0	+	0	—	8/16/35	9/15/36	Well	0	0	0	Nose fracture 4 years ago
16	134381	F	62	L	0.6	48	+	++	+	+	+	+	0	+	+	0	+	0	—	10/25/35	9/15/36	Well	0	0	0	Nose fracture 4 years ago
17	149214	F	35	L	1.2+3	48	+	+	+	+	+	+	0	0	0	0	0	0	—	8/21/36	3/23/37	Well	0	0	0	Prescription for lues
18	167196	M	46	L	0.2+1	24	+	++	+	+	+	+	0	+	+	+	0	+	Slit punct.	2/ 5/37	4/10/37	Well	+	0	0	Snellen sutures L lower lid
19	153938	F	39	R	1.5−1	84	+	++	+	+	+	+	0	+	+	0	0	0	—	6/29/36	10/12/36	Well	0	0	0	
20	154678	F	72	R	0.5+2	24	0	0	+	+	+	+	0	0	+	+	0	0	Incision and drainage 6/30/36	7/ 8/36	11/ 3/36	Well	0	0	0	
21	154678	F	72	L	0.6+1	24	+	++	+	+	+	+	0	0	+	+	0	+		7/22/36	11/ 3/36	Well	0	0	0	

had been removed and in another there had been two operations, 23 and 28 years previously.

The patients were seen on the final visit from one to 27 months after operation, the average being 8.4 months.

In case 3 (see table) a hemorrhage occurred two days after operation, but this in no way interfered with the result.

In case 4 an acute attack of dacrocystitis took place two months before operation. The patient was free from symptoms until three months later, when granulations appeared in the nose. These have been cauterized and she is again symptom free. She had a keratitis from pontocaine used in the treatment of the granulations. This cleared in a few days.

In case 8 there was a closure of the nasal window (one of the first patients operated on), which required a second operation two-and-one-half months later. She was free from symptoms 19 months after the second operation.

The patient in case 9 had a fractured maxilla with involvement of the ophthalmic branch of the fifth nerve. Neither the West nor the Toti operation could be performed and the sac was extirpated.

Case 10 required an operation to remove a fistulous tract, after which the symptoms were relieved.

In case 12 there were a fistulous tract from an old abscess and a superficial skin abscess which had to be drained.

Case 18 was complicated by a slit punctum and a lower lid that did not touch the globe. Two Snellen sutures were placed in the lower fornix to turn it in. The patient is still under treatment.

The results were good in all but three cases, 85.7 percent: Case 9 was a failure because of the distortion from the fracture. The patient in case 2 was from out of the city and no attempt could be made repair the slit punctum. The nasal opening remained large. Case 4 is not closed; the patient is still under treatment and it is too early to know the end result.

A slit punctum alone is not sufficient to prevent a good result from this operation. There were four in the series. Two were successful, one unsuccessful, and the other still under observation.

Summary and conclusions

Twenty-one tear sacs have been operated on by intranasal dacryocystorhinostomy with 85.7 percent successful results.

For cases of dacryocystitis with obstruction at the lower end of the sac, operation via the nasal route is preferable to dacryocystectomy, which does not often relieve tearing, and to the Toti operation, which leaves a scar.

122 South Michigan Avenue.

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NOTES, CASES, INSTRUMENTS

MUCOUS-MEMBRANE TRANSPLANT IN RECURRENT PTERYGIUM*

JOHN GREEN, M.D.
Saint Louis

The Rev. V. M., aged 37 years, consulted me November 19, 1935. He had first noticed a pterygium on his left eye several years ago, and had submitted to an operation by an ophthalmologist in southwest Missouri. This was followed by a recurrence. A second operation was performed by the same ophthalmologist. The growth again recurring, a third operation, which included cauterization, was followed by recurrence and limitation of motion outward so that diplopia was present on attempts to look past the median line.

The apex of the pterygium reached 4 mm. on to the cornea. The body was underlain by a mass of cicatricial tissue. The caruncle was displaced temporally, as was evident from the presence of a few sparse hairs occupying a position several millimeters to the temporal side of the normal position of the caruncle. Motion was checked 5 degrees to the left of the median plane.

The first operation consisted of a clean dissection of the pterygial tip and an incision along the upper border of the body of the pterygium. The body itself was closely adherent to a mass of cicatricial tissue which was also adherent to the sclera. The scar tissue extended back to, and even beyond the usual site of the caruncle. The apex of the pterygium was cut off and the conjunctiva sutured to the episclera near the corneal limbus above. The technique was that advocated by Campodonico.

In order to insure complete immobility, both eyes were kept bandaged for four days. The patient returned to Saint Louis February 4, 1936, with the condition not only not improved but probably a little worse than before my operation. There was a growth 4 mm. on to the cornea and a displacement of the caruncle, which occupied a position midway between its normal site and the corneal limbus. Scar tissue prevented motion outward beyond the median line.

It was obvious that a much more extensive removal of the scar tissue would be necessary and this could not be accomplished without creating a conjunctival gap too large to be covered by conjunctiva derived from the globe.

On several occasions I have made Thiersch grafts to fill in similar gaps, but the cosmetic results have never been satisfactory. Not only does the skin graft present a dead white waxen appearance, but there is a more or less continuous shedding of surface epidermis. It was decided, therefore, this time to use a mucous-membrane graft from the inside of the cheek. Under the circumstances, it was better not to dissect off the pterygial tip but to leave it, together with a narrow strip of conjunctiva adjacent.

The scar tissue, which was extremely dense and was adherent not only to the sclera but also to the internal-rectus tendon, was dissected off. It extended both above and below the tendon and well back toward the equator of the globe. The dissection was extremely tedious. At its conclusion the caruncle was pretty well freed and appeared to occupy its normal position. A gap approximately 12 mm. in diameter remained at the conclusion of the

* Read before the Saint Louis Ophthalmic Society, March 26, 1937.

dissection. An area about 15 mm. in diameter inside of the cheek was injected submucously with 2-percent novocaine and a mucous-membrane flap was dissected out with scissors and scalpel. After removal it was disconcerting to find how thick the flap was and despite efforts to remove as much submucous tissue as possible the flap was thicker than desired. The flap was transferred to the denuded area and held in position by several 0000 catgut ligatures. Both eyes were bandaged. Healing was uneventful.

There was certainly some reformation of cicatricial tissue so that there is still some limitation of outward rotation. There has been no further invasion of the cornea by the pterygial tip. Diplopia was complained of a good deal at first and to make the patient more comfortable spectacles with B & L occluder over the left eye were prescribed. Abducting exercises were ordered. The increase in abductive power was quite marked and it was not long before the patient learned to adapt himself so that he no longer notices diplopia except when turning the eyes to the extreme left. From a cosmetic standpoint all that can be said is that the flap is light pink in color and somewhat thicker than normal conjunctiva. It is, however, less conspicious and from the patient's standpoint less troublesome than a skin graft would have been.

3720 Washington Boulevard.

A SIMPLE ILLUMINATING DEVICE FOR GONIOSCOPY WITH THE BINOCULAR MICROSCOPE*

MAX FINE, M.D.
San Francisco

With the increasing recognition of the value of gonioscopy as a clinical procedure the need was felt for a simple illuminating device to be used with the binocular microscope in order to obviate the necessity for an assistant. The apparatus described by O. Barkan and his associates[1] is admirable for research investigation but is quite cumbersome and expensive for routine office use. Many ophthalmologists possess a binocular microscope for slitlamp examinations and a duplication of equipment may be undesirable. It has been proved repeatedly that the more simple and available an apparatus is, the more frequently will it be used. Castroviejo[2] has devised an ingenious illuminating device for attachment to

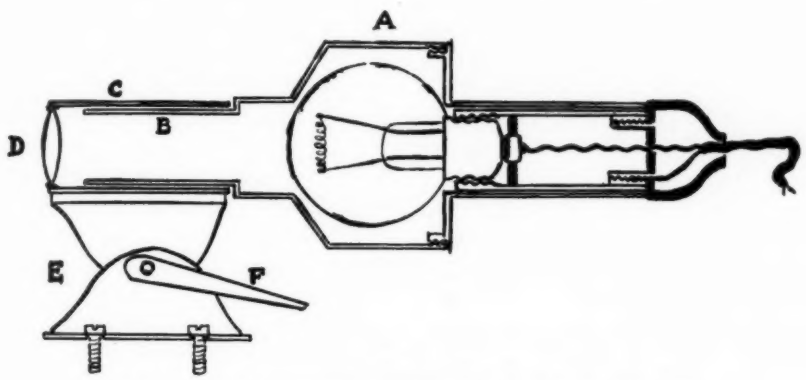

Fig. 1 (Fine). Diagram of illuminating device for gonioscopy.

* From the department of Ophthalmology, Stanford University School of Medicine.

the binocular microscope. This particular instrument had, for the author at least, the disadvantage that it could not be used with the revolving turret head for various magnifications. Also, it added appreciably to the bulk of the apparatus that had to be held steady in the hand.

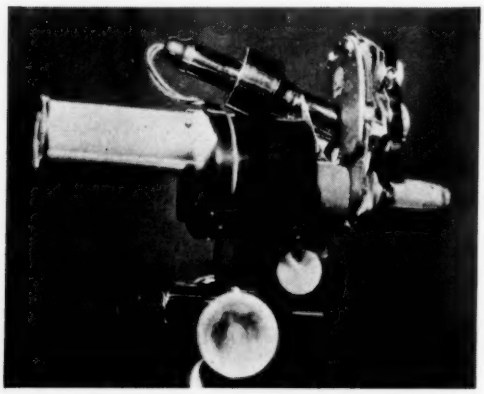

Fig. 2 (Fine). Illuminating device attached to binocular microscope.

The simple device described below has been found very satisfactory. The entire weight is only two ounces and it can be constructed by any machinist for a few dollars. The original instrument was constructed from the parts of an old electric retinoscope. It consists of a small metal housing (A) enclosing a six-volt lamp. From the front of the housing there projects a tube (B) 20 mm. long and 10 mm. in diameter. This slides snugly into an outer tube (C) 25 mm. long, in the distal end of which there is fixed a +30 D. lens (D). The tube bearing the condensing lens is fastened by means of a hinge (E) to a small plate which is attached to the mounting of the turret with the two screws. The end of the tube just fits into the central opening in the turret head of the Zeiss microscope. It can be tilted to the proper angle on the hinge and secured there by the lock (F) on the hinge bolt. This portion of the device (condensing lens, hinge, and foot plate) remains attached to the microscope and does not interfere with its use with the slitlamp. When it is to be used for gonioscopy the tube (B) is slipped into the outer tube (C) and the equipment is ready. This sleeve arrangement may also be used for focusing the light to a limited extent, but it has been found that a brilliant diffuse illumination serves all clinical purposes. The lamp is connected with a small transformer supplying six to 10 volts. The Shahan light transformer is ideal.

The author is greatly indebted to Mr. J. D. Brower of Trainer and Parsons Optical Company, San Francisco, for valuable suggestions and for the actual contruction of the instrument.

490 Post Street.

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SOCIETY PROCEEDINGS

Edited by Dr. H. Rommel Hildreth

MINNESOTA ACADEMY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY

Section on Ophthalmology

December 11, 1936

Dr. W. L. Benedict, *president*

Episcleritis and its Relation to Disease of the Female Pelvic Organs

Dr. W. L. Benedict (Rochester) said that episcleritis and scleritis appear in various forms as acute, intermittent, or chronic affections of one or both eyes. The disease attacks only adult persons and is more common in women than in men. The superficial forms and some of the intermittent forms of the disease are not harmful to sight, even though they may persist over many years. The deeper forms of the disease affecting the sclera and uvea lead to permanent changes in the coats of the eyeball. Some forms are very painful during the stage of inflammation. Repeated attacks of scleritis lead to thinning of the sclera, the appearance of slate-colored areas in the anterior sclera where inflammatory nodules have been situated, staphylomata in the ciliary zone, and sclerosing keratitis. Through changes in the uvea, the lens and vitreous become cloudy and in some cases secondary glaucoma leads to blindness.

The etiology of the disease has been attributed to tuberculosis, syphilis, gout, leprosy, focal infection, and disturbances of menstruation. It has long been known that episcleritis is associated with uterine disorders and is prone to occur in adult females who are subject to disturbed menstruation. Histopathologic studies have confirmed the diagnosis of tuberculosis in many eyes enucleated because of grave effects of severe scleritis. Some ophthalmologists have stated that nearly all cases of episcleritis and all cases of nodular scleritis are due to tuberculosis, but neither pathologic examination nor clinical experience offers adequate confirmation of this assumption.

Studies of a series of cases of scleritis in women in whom a relation between the attacks and disturbances of menstruation could be established showed that the cervix and the uterus were foci of infection. Bacteriologic studies revealed a green-producing streptococcus as the offending organism in all cases. In cases in which this relationship could be established, attempts to correct the uterine disorder were made. In some cases the cervix was cauterized; in others, hysterectomy was performed. Improvement in the eye condition invariably followed operation. Recurrences were rare and in most instances mild.

Discussion. Dr. F. R. Heilman (Rochester; by invitation) said he had not had much experience with episcleritis but that in the few cases studied he had the impression that bacteriologically and immunologically the mechanism operating was similar to that occurring in many other chronic diseases. Respiratory infections and foci of infection activate an inherited tendency to hyper-reactivity or allergy to various antigens. Due to lowered resistance of some tissue or area, it becomes the site of an inflammatory reaction on the basis of a hypersensitiveness to the antigen to which it is exposed. In an arthritic patient, it is the joint tissues and synovia that are sensitized. In the patient with episcleritis, it is an area of the eye. The antigen most commonly activating the process is the green strepto-

coccus. It is commonly found in foci of infection, is usually of low general virulence, and yet has pathogenic potentialities. The organisms themselves need not invade the tissues, but their products may incite the reaction. Patients with low-grade inflammatory processes are frequently reactive to autogenous streptococcus vaccines and to streptococcus vaccines from other patients with the same disease.

Dr. H. W. Grant (St. Paul) said that Dr. Benedict's paper was extremely interesting because almost everyone has had a different type of treatment of episcleritis, the thermophore, foreign protein, actual cautery of the sclera itself, and all of these various procedures have temporarily relieved the patient. If one does not see the recurrence, it is very likely that the person has gone elsewhere when the exacerbation occurred. The actual way in which episcleritis occurs from a focal infection is a little difficult to understand, but Dr. Grant considered Dr. Heilman's description to be excellent. Dr. Benedict described the slight involvement of the vitreous and ciliary body in some cases of long standing. In one with marginal opacities, complete seclusion and occlusion of the pupil, and a hypermature cataract, which Dr. Grant had observed over a period of 15 years, acute glaucoma occurred suddenly from a severe hemorrhage in the anterior chamber. After the anterior chamber had been thoroughly washed with saline solution and an iridectomy performed, the tension was reduced to normal. At the time of cataract extraction, the conjunctiva was so firmly adherent to the sclera that it was impossible to secure a flap. Cataract extraction, however, was uneventful, and sutures were placed through the thickened margins of the conjunctiva. There was no loss of vitreous. Recovery following extraction was uneventful without any untoward ciliary reaction. In spite of the corneal opacities, vision was approximately 20/100 with correction.

Dr. C. N. Spratt (Minneapolis), in discussing Dr. Benedict's paper, said he would like to ask Dr. Benedict if, in the cases reported, the tuberculin test was made, and what proportion of these cases were positive. His reason for asking was that he had reported, in 1912, a series of cases of scleritis before the Minnesota State Medical Society. All of these had a positive general and local tuberculin reaction. All had recovered under treatment with small doses of tuberculin. While a house officer at the Massachusetts Eye and Ear Infirmary, he had occasion to observe Verhoeff's work on the pathology of scleritis and later had seen the experiments of Stock and of Freiberg. Both of these investigators were of the opinion that all cases of scleritis and sclerosing keratitis were of tubercular origin. Stock injected the ear veins of rabbits with cultures and had invariably obtained small foci in the choroid, uvea, and sclera. Instead of increasing in size and finally destroying the eye, as happens when bacteria are introduced directly into the anterior chamber, it was found that these lesions generally underwent spontaneous healing. Histological examination showed these foci to consist of round cells; later epithelioid cells appeared within them, and excepting one instance, caseation never occurred.

Dr. Spratt said that in the last 20 years he had discontinued the use of tuberculin and had relied entirely upon the Shahan thermophore, which was applied to the areas of the sclera involved for a period of one minute at a temperature of 145 degrees. A speedy and rapid cure was obtained in every case. He said that he was very doubtful if any of his patients with scleritis would consent to radical surgical work such as suggested by Dr. Benedict.

While scleritis is a protracted disease, and recurrences are frequent, pain has not been a serious symptom and loss of vision is a rare complication.

Dr. E. J. Borgeson (Minneapolis) thought that perhaps the cases seen in the Mayo Clinic are more severe than those in private practice. He had seen some 25 or 30 cases and did not recall any that lasted more than three or four weeks. They were all treated with foreign protein and local treatment. He did not recall one that did not respond to that sort of therapy.

Dr. Benedict (in closing) said that one cannot consider the diseases of scleritis and episcleritis without recognizing several different forms of the disease. Some individuals who are neurotic in temperament have a mild episcleral injection that is sometimes diagnosed as conjunctivitis; it lasts for a few days and then disappears. That condition is known as episcleritis fugax. It probably is not due to infection. It has been assumed that it is due to some endocrine disturbance. There is no pathological proof of this. There is also an episcleritis that involves only the superficial tissues of the eye and occurs in the menstrual periods. It is noted in the textbooks of Weeks, Fox, deSchweinitz, and others. Exacerbations have been noted at menstrual periods or at missed menstrual periods and are interpreted as vicarious menstruation. The etiology of tuberculosis has been brought into the discussion. Some years ago Dr. Knight and the writer reported on two eyes which had been removed. In those two patients there was no clinical evidence of tuberculosis, yet the pathological picture was that of tuberculosis. It is well known that the pathological appearance of tuberculosis is so similar to the pathological appearance of local granulomas and ocular manifestations of some systemic diseases that it is difficult for the pathologist to distinguish a difference. Whether the uveal tract is involved secondarily or is a coincident infection with lesions in the sclera has given rise to considerable discussion. As stated in the paper, it is not clearly established whether this is a single infection that is transmitted to the uveal tract or whether it is a separate infection. The lesions in the eye are histologically similar to tuberculosis and frequently attributed to focal infection. Dr. Benedict said their studies had shown that a green-producing streptococcus will produce such a lesion. They have been unable to find any bacterium, aside from streptococcus, which would produce such a lesion. He had at hand case histories collected during the past 20 years—37 in all—in which amputation of the cervix or hysterectomy was performed. In no case was hysterectomy performed only because of infection in the eye itself; but always there was evidence of uterine infection also. The infection in the sclera usually disappeared within three days from the time the operation was performed and it never recurred.

Dr. Benedict said he had used the thermophore for its local effect to reduce inflammation of the eye. At temperatures of 140 degrees to 160 degrees the thermophore is kept in contact with the sclerotic nodule long enough to produce local reaction without necrosis. After a few days the inflammatory lesion will disappear, but that is by no means a cure. So long as the source of the disturbance has not been removed there is no question but that recurrences will take place, although at irregular intervals. Peculiarly enough, their clinical observation had shown that all through the child-bearing period there may be no evidence of scleritis, particularly during the pregnancy and lactation.

It is impossible to conceive of episcleritis as being a local disease of the eye. Simply to treat the local disease (and

there are many ways of getting rid of the local reaction) has absolutely no influence on the cause of the disease, and to assume that getting rid of the local lesion in any way gets rid of the origin of the disease is to blind oneself to the facts. Episcleritis is evidence of disease somewhere else in the body. The clinical observation that inflammation of the eye subsides after the removal of an infected uterus led him to believe that here was a source of infection that was just as potent as infection of the teeth. Cultures of teeth, tonsils, and pelvic organs (uterus in women and prostate in men) always disclosed the same type of streptococcus. Therefore they have reason to believe that if a woman has recurrent attacks of episcleritis and if there is no question about the virulence of the streptococci in the pelvic organs, they are justified in removing the uterus.

Walter E. Camp,
Secretary.

NEW ENGLAND OPHTHALMOLOGICAL SOCIETY

December 15, 1936

Dr. James J. Regan, *presiding*

Modified souter tonometer

Dr. James J. Regan demonstrated a new modified Souter tonometer which was very much like the old model with the exception of the lock on the instrument. When the dimple on the cornea is ascertained, pressure on the small button locks the indicator in position.

Irrigation speculum

Dr. Walter B. Lancaster demonstrated his irrigation speculum, and suggested the use of such a speculum especially in gonorrheal diseases of the eye. Gonococci will die at a temperature of 106°F. Instead of raising the temperature of the entire body to 106 degrees he believed that it would be wiser to syringe the eye with a fluid of that temperature. The old method is dangerous and deaths have been reported. Dr. Lancaster felt it was wiser to have the solution 110 degrees or 112 degrees for 20 minutes than 106 degrees to 107 degrees for eight to nine hours. Pontocaine should be instilled in the eye two to three times during the treatment so that the heat may be tolerable.

Ocular allergy

Dr. A. D. Ruedemann stated that nearly every type of eye condition, external or internal, may be found with accompanying allergic manifestations elsewhere in the body. He attempted to show by statistics the frequent association of these phenomena with common ocular pathology. Among those included in the discussion was the frequent association of allergy with progressive myopia. Papilledema occurred after ingestion of chocolate or nuts and in one case after exposure to primroses. Blepharitis and corneal ulceration were frequently due to orris root in face powder.

Discussion. Dr. F. M. Rackemann said that the pathology of asthma consisted essentially in an increased permeability of capillaries with outpouring of fluid containing eosinophile cells. The tuberculin reaction is called allergic and we recognize that such inflammatory responses may represent the first phase of the immune process, just as the urticarial reaction represented a later phase.

The positive skin test can occur without the clinical disease being manifest and, conversely, a negative skin test may be present in a person with a known sensitivity. An accurate history is of vital importance in establishing a diagnosis of allergy. Dr. Rackeman further stated that drug allergy is a frequent cause of obscure

symptoms, especially the barbital drugs, used so freely as sedatives.

Virgil G. Casten,
Recorder.

CHICAGO OPHTHALMOLOGICAL SOCIETY

December 21, 1936

Dr. G. Henry Mundt, *president*

Absorption of a mass of tuberculous iris nodes under rest treatment alone

Dr. E. V. L. Brown said that this patient, a woman 25 years of age, had been shown before this society in April, 1936, by Dr. J. T. Stough, at which time a large mass of conglomerate nodes (15 to 20) was present in the right eye, over the proximal half of the lower nasal quadrant of the iris, and an active iridocyclitis. Repeated X-ray and clinical examination failed to demonstrate definite pulmonary tuberculosis, but in the opinion of the phthisiologist, observation should be continued.

The patient, with successive stereophotographs (March, July, September, December) of the anterior segment of the eye, was at this time presented to show the complete disappearance of tuberculous iris nodes under rest treatment alone, no tuberculin treatment having been administered. The iridocyclitis continued to be very active in each eye.

Blepharochalasis

Dr. Roy O. Riser said that this patient, a 22-year-old white man, presented himself at the Research Hospital with the history of excessive skin in both upper lids since the age of four or five years. The onset was gradual and painless, but with occasional sudden swellings. The condition had been stationary for over five years.

Examination revealed both upper lids to be quite pink in color, due to the thinness of the redundant skin. The skin lay in folds, reaching down to the upper lash line, but not interfering with the intrapalpebral space. The superficial vessels were dilated. No excessive fat had accumulated under the skin, and no adhesions were present. The lid action was in every way normal, both in opening and in closing the eyes. The conjunctivae, both bulbar and palpebral, were normal. The vision was 1.5 in each eye and the fundi were normal.

The evolution of flash perimetry

Dr. Leo L. Mayer read a paper on this subject which was published in this Journal (August, 1937).

Discussion. Dr. Leo L. Mayer (closing) said that some difficulty is experienced in bringing the target close to the fixation point, for with the Schweigger hand perimeter there is a central dial that interferes. There is never any doubt as to when the flash occurs.

There is no question of color field; the method is purely quantitative. As shown in the first chart, red color fields were taken because the neon light is red. There is a tremendous difference between the outline of the field with the flash and with the ordinary red-color target. It was found very definitely that the two cannot be confused and that another type of quantitative field was obtained. Of course, even with red fields, if the illumination is bright enough and the target is large enough, fields may be obtained comparable to those outlined with the use of a white target. There is a vast difference in the fields, and the flash field is much larger than the field for red.

It was found very often that a scotoma showed up early and was much easier to demonstrate because the method is handy and does not take time. With the Rönne

step, these fields were taken on the ordinary perimeter, either hand or Ferree-Rand. By checking carefully on the Bjerrum screen the same picture may be obtained; but it takes longer and is a more tedious process.

The flash speed is now up to one millionth of a second. Still the macula perceives it. The theory is that there must be some minimum of stimulation that the optic nerve will not carry. All this work was done under seven foot-candles of illumination.

Refractive errors in the same eyes under scopolamine and under atropine cycloplegia

Dr. Louis Bothman read a paper on this subject which was published in this Journal (August, 1937).

Discussion. Dr. G. Henry Mundt said that he had used scopolamine extensively for more than a quarter of a century. There is no question that it is almost as reliable as is atropine. It works beautifully in children. It is highly toxic, and he recalled that he had been severely criticized by several men who had found there was a severe reaction. Scopolamine should not be put into the hands of the general public because of its toxicity. Where homatropine fails, scopolamine has been used for many years. Dr. Bothman's reference to the loss of time sustained by the patient whose refraction is tested under atropine is timely. That is the chief disadvantage of atropine—it puts the patient out of commission for a considerable period. Homatropine has of course many disadvantages. With scopolamine the refraction can be done almost over the weekend, and done satisfactorily. However, it must be emphasized that scopolamine is toxic. He had made his own solution for many years because he wanted to know what he was putting into the eye.

Injection of air into the anterior chamber after cataract extraction

Dr. Elias Selinger read a paper on this subject which was published in this Journal (August, 1937).

Discussion. Dr. Dewey Katz believed that Dr. Selinger would agree that a choroidal detachment is present in the majority of cases in which the anterior chamber does not re-form for a few days after an intraocular operation. He wished to know if Dr. Selinger had seen a case of choroidal detachment with an abolished anterior chamber in which the detachment disappeared following the injection of air into the anterior chamber? If not, is he of the opinion that the injection of air into the anterior chamber will cure the choroidal detachment? As a rule, choroidal detachment is looked upon with equanimity, but he had seen one or two such cases in which the end result was most undesirable. Dr. Selinger had stated that a corneoscleral suture was a prerequisite for the procedure of injecting air into the anterior chamber. Elschnig, who does this rather frequently for certain complications at the time of lens extraction, does not use this suture. It is desirable to have one, but not necessary. Elschnig makes certain when he does inject air into the anterior chamber that none of it gets behind the iris into the posterior chamber, for fear of secondary glaucoma, which might ensue due to the blocking of the iris angle.

Dr. Elias Selinger, replying to Dr. Katz, said that he was not in a position to state whether choroidal detachment can be prevented by injection of air into the anterior chamber. He had seen no detachments of the choroid immediately after lens extraction, because he had never made any effort to examine the eyegrounds the first or second day after operation. Elschnig uses a conjunctival su-

ture in his lens extractions, and it should be said that either a corneoscleral or conjunctival suture is a prerequisite to air injection into the anterior chamber. Personally, he believed that the corneoscleral suture is the better of the two. In no case did he observe air behind the iris, nor had he seen glaucoma develop following the injection of air into the anterior chamber after cataract operation.

Robert von der Heydt.

WASHINGTON, D.C., OPHTHALMOLOGICAL SOCIETY

January 4, 1937

Dr. James N. Greear, Jr., *president*

Symposium on ocular tuberculosis

The clinical aspects

Dr. Jonas Friedenwald enumerated the chief clinical types of ocular tuberculosis. (1) The juvenile form, occurring in patients with low immunity in which there is a spreading caseous lesion. (2) The adult form, occurring in patients with high immunity, in which there are isolated lesions that show marked tendency to heal and to relapse. The latter form occurs in two clinical types: those with a high degree of allergy in which the lesion is exudative and caseous and those with a low degree of allergy in which the lesion is hard, nonexudative, and noncaseous. These differences, however, are also influenced by the number of bacilli involved in the lesion. In general, ocular tuberculosis usually involves either the anterior or the posterior ocular segment.

Dr. Friedenwald said that in the diagnosis of the adult form of ocular tuberculosis aside from the characteristic clinical picture and its relapsing long-drawn-out course, the age of onset of the affection is important. Practically all of these cases have their initial ocular lesion in patients under the age of 35 years. He said that the intradermal tuberculin test was of little value in diagnosis since positive tests are obtained in many people who do not have ocular tuberculosis and, in rare instances, negative tests could be obtained in cases of undoubted ocular tuberculosis. He stressed constitutional treatment with particular reference to avoidance of fatigue and of intercurrent infections as being of more importance than specific treatment.

Pathology

Major James E. Ash of the Army Medical Museum presented slides showing the pathology.

Bacteriology

Dr. Leland W. Parr said that to the bacteriologist the ideal diagnosis of a condition incited by living agents is the isolation in pure culture of the agent concerned. He commented on the difficulty of growing the tubercle bacillus from blood cultures in most forms of tuberculosis, which, he said, might be due to the residence of the tubercle bacilli in monocytes, this interfering, in most cases, with cultivation. Also, in the metastatic eye conditions, if the primary lesion is quiescent tubercle bacilli may not be in the blood at all. He reviewed Soule's work on tuberculous guinea pigs in which administration of tuberculin increased the number of positive blood cultures, although the number of such positive cultures was, at best, small in relation to the total number of animals examined.

Dr. John H. Hanks said the idea that the sensitized cells of the tuberculous eye are injured by proteins from the tubercle bacillus is in keeping with the point of view which is crystallizing in the field of

tuberculin allergy. Specific desensitization with tuberculin would therefore appear to be a procedure which is logical, as well as beneficial, in cases in which there is no general tuberculosis. The unfavorable results of treating general tuberculosis with tuberculin causes one to wonder what special factors make this treatment favorable in ocular infections. Is it possible that the treatment could be used in other forms of tuberculosis with procedures as cautious as those employed in ophthalmology? Dr. Hanks said that the new Purified Protein Derivative, developed with the assistance of the National Tuberculosis Association, was an improvement in the control of dosage.

Ocular tuberculosis

Dr. E. Leonard Goodman presented a case. Two years ago the patient, a woman, had a redness of the left eye with the sensation of a foreign body, but no secretion. Since that time the eye had been injected and sensitive to light but without marked pain at any time. The vision in the left eye had decreased gradually to 7/200 in the past two years. There were moderate ciliary injection with many large and small precipitates on the posterior corneal surface, and moderate roughness of the anterior corneal surface but no abrasions. This roughness of the corneal surface was apparently due to edema incident to a mild interstitial keratitis. The iris presented a number of large nodules occupying about seven eighths of the iris tissue. These were yellowish red in appearance, and all seemed to arise from the mid-portion of the iris stroma, except one nodule which appeared to come from the iris root. These masses had a slightly cystic and transparent appearance, but did not impress one as being cysts. Vascularity was not marked, but the vessels which were present were dilated. The pupil was irregular due to the nodules and the posterior synechia. The iris nodules below were in contact with the cornea where they had produced deep infiltration and vascularization. No fundus details could be seen owing to the corneal condition, but a faint red reflex was present. The tension of the left eye was 23 mm. Hg (Schiötz). The right eye was without pathology, and the vision was 20/20.

The intradermal tuberculin test was negative. However, 16 hours after the subcutaneous injection of 3 mg. of tuberculin there was a moderate exacerbation of the focal reaction. This was not again noted after a subsequent injection of 5 mg. of tuberculin, subcutaneously. Less importance can be placed on this reaction, owing to the fact that the patient gives a history of spontaneous exacerbations over a long period of time. All other tests were negative, including blood count, Wassermann, provocative Wassermann, chest X-ray, feces, sputum, and temperature. Nothing abnormal was found on general physical examination except two decayed teeth, which were extracted.

Ernest Sheppard,
Secretary.

AMERICAN JOURNAL OF OPHTHALMOLOGY

Published Monthly by the Ophthalmic Publishing Company

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AN ACADEMY BULLETIN

In April, the American Academy of Ophthalmology and Otolaryngology published a rather extensive discussion of the question as to whether that organization should publish a monthly bulletin or even a monthly journal, the latter to contain original scientific articles.

The editor of this Journal has been considering the matter carefully for the past three months and has discussed it with the directors of this and other journals and many officers and members of the Academy. It seems appropriate to present the results of these deliberations to our readers.

The purpose behind printing a monthly Academy bulletin would be to keep the membership in close touch by furnishing an official organ, published regularly and frequently. It would serve as a medium for the interchange of ideas of Academy members on subjects related or of especial interest to the Academy and as a means of disseminating information about Academy activities. Another idea was that by publishing the papers presented at the meetings in this bulletin it might be possible to do away with the Transactions, which are a matter of considerable expense to the Society.

The Academy has now enrolled more than 3,000 members; it is the largest special society in the world. It has enough interests to produce material for a monthly bulletin, and it seems fitting that such a society should have an official organ. In this bulletin could be published, if thought desirable, all the material presented at the fall meeting, but it is questionable if the

membership of the Academy would be satisfied with the bulletin as a substitute for the Transactions. These have formed an impressive and valuable collection through the years. They are bound and easy to keep. Bulletins and journals are paper covered; there are twelve instead of one. They are bulky and unhandy to stack, and present anything but a pleasing appearance on library shelves. To be sure, one may have them bound, but probably not one tenth of journal readers go to this trouble and expense.

The problem might be solved by the Transactions in a similar way to that followed by the Association for Research in Ophthalmology; namely, by publishing first in a journal (in the case of the Academy it would be in the bulletin), using a page format which would permit of making up the Transactions directly from the bulletin forms. This is relatively inexpensive and would serve the purpose well. By arrangement, if so desired, journals of ophthalmology and otolaryngology could reprint articles of especial interest for their readers who were not members of the Academy and might otherwise miss such articles.

Relative to publishing, instead of a bulletin, a journal which would contain original scientific articles and compete directly with the existing journals, there are many points to be considered. The arguments in favor of such a course are that this would furnish a good eye, ear, nose, and throat monthly journal at a reasonable cost to the membership and would possibly add prestige to the Academy.

Against it are the following points:

1. There is a large group in the Academy that is interested either in ophthalmology or otolaryngology and not in both. These men do not want a mixed journal, nor is it reasonable to expect them to pay for the publication of such a journal.

2. The tendency, as each specialty has become more comprehensive (so that no man is now vain enough to think that he has mastered the whole of it), has been for those who have been able to do so to concentrate either on ophthalmology or on otolaryngology. In the best institutions the departments are separate, and there are few indeed on the teaching staffs who carry on both specialties. For the Academy to publish an eye, ear, nose, and throat journal would seem a step backward and the Academy has ever been progressive, not regressive.

3. Omitting the question in regard to otolaryngology, there are not sufficient worthy original ophthalmologic papers for another large and active ophthalmologic journal in the field. This has been recognized and the idea advanced that one of the existing journals might be acquired by the Academy in each specialty concerned. From a practical point of view it is extremely doubtful if this could be done. This Journal, after many successful years as an independent ophthalmologic organ would scarcely consider giving up its identity, especially to be absorbed by an eye, ear, nose, and throat publication, and it seems equally unlikely that The Archives of Ophthalmology would consider such action.

There is no question but that great harm would be done to the existing journals; the original ophthalmologic material would be distributed three ways instead of two ways, and the ophthalmologist who wished to be aware of what is happening in the ophthalmic world would have to purchase one more journal.

Much could be written on this subject. Hours have been spent in its discussion. But this seems to cover briefly the essentials.

In conclusion, a reasonable opinion seems to be that a monthly Academy bulletin would be desirable but that a month-

ly eye, ear, nose, and throat journal to be published by the Academy would do more harm than good to the profession.

Lawrence T. Post.

THE SPHENOPALATINE GANGLION

The reflex relationships between the eye and the nose have given rise to remarkable claims of cure of ocular irritations. Unfortunately the results obtained have not infrequently smacked of quackery. Or at least they have suggested certain dangerous tendencies to the development of drug addictions.

The measures adopted for relief of conditions attributed to such reflex relationships have consisted in part of surgical removal of nasal structures, in part of cauterization of certain sensitive areas in the nose, in part of anesthetization of responsible areas of mucous membrane.

Since cocaine is capable of producing a number of remarkable effects not only as to a local but also as to a general sense of well being, and since the habitual use of cocaine is one of the most dangerous of the drug addictions, the risks involved are easy of appreciation.

Conversely, all startling cures alleged to have been obtained by local (or of course general) use of cocaine must lie under a cloud of suspicion.

The sphenopalatine ganglion, through its reflex relationship, has been blamed for a wide variety of annoying symptoms as well as for anatomic changes in the tissues of the eye. These include lacrimation, various forms of keratitis, conjunctival irritation, episcleritis, ocular pain (as well as typical migraine), trachoma, and neuralgia.

Anesthetization of the region of the ganglion has been credited with cure of migraine and neuralgia; of the pain following ophthalmic zoster, as well as of zoster itself; of the paroxysms of acute glaucoma; and of such psychic irregularities as excessive anxiety or mental distress.

The sphenopalatine ganglion, also known as Meckel's ganglion, is a small structure at the base of the sphenoid bone and directly above the posterior end of the middle turbinate. The lower part of the ganglion is in close relation with the posterior palatine canal, which opens above and inward from the last upper molar tooth.

The ganglion has important nerve relationships. The superior maxillary nerve, a branch of the trigeminal, runs in such close proximity to the sphenopalatine ganglion that some authors consider the nerve as a branch of the ganglion. Of the ganglion's three roots, the first, the vidian nerve, is formed by junction of the great superficial petrosal branch of the facial and the great deep petrosal branch of the glossopharyngeal. The second root is also known as the sympathetic. The third root is sensory, and is derived from the superior maxillary nerve. The efferent branches of the ganglion are distributed especially to the nasal fossae and to the orbit; anastomose with the ophthalmic and otic ganglia; and, according to one writer, supply the sheath of the optic nerve.

Of the several routes by which one may approach the sphenopalatine ganglion, that via the posterior palatine canal has the disadvantage that the canal contains the palatine artery. The simplest approach is by application of a cotton pledget above the posterior end of the middle turbinate bone.

The sphenopalatine is a sympathetic ganglion. It innervates the lacrimal gland and the nasal pharyngeal cavity. Its intimate association with certain ocular structures is illustrated by sequels of applications made to the ganglion through the nasal route. The eye on the same side

reddens and manifests a flow of tears, the upper lid may develop a slight edema, the pupil may dilate. Furthermore, the patients may experience pain at the vertex of the cranium, in the teeth, the palate, or the larynx, and they frequently speak of paresthetic sensations in more remote parts of the body. More exceptionally, the sensibility of the cornea may be reduced, the size of the pupil may increase, and there may be variations in retinal arterial pressure.

The anatomy of the ganglion, the literature of the subject, and the therapeutic problems involved have recently been reviewed at considerable length by Dubois-Poulsen (Annales d'Oculistique, 1937, volume 174, page 217). He considers the activity of the ganglion under four heads, secretory, vasomotor, sensory, and trophic. He describes his personal experiences in the effects of anesthetization of the ganglion for disorders depending upon these four functions.

A number of patients who had complained of chronic overactivity of the lacrimal gland, although with eyes otherwise apparently normal, declared themselves entirely relieved by cocainization of the posterior end of the middle turbinate. Similar treatment was regarded as having restored the conjunctival vasomotor system to normal in cases without apparent bacterial cause for conjunctivitis, and a like explanation is given for relief of a number of obstinate cases of episcleritis.

In keratitis, the most striking successes were obtained in subjects with pannus which was not due to trachoma, although such benefits also occurred in some obstinate cases of actual trachoma which were accompanied by extremely abundant lacrimation. To a deep reflex action must be attributed cessation of the usual keratitic symptoms of pain, photophobia, and blepharospasm; although the author raises the question whether the beneficial result may not be in part due to drying up of a lacrimation which has kept the cornea in an abnormal condition.

Charlin has described a "syndrome of the nasal nerve" consisting of inflammation of the anterior segment of the eye (usually in the form of a keratitis), neuralgic pain at the points of emergence of the branches of the nasal nerve, and an abundant watery nasal discharge. Dubois-Poulsen found that these cases showed more lasting cure after anesthetization of the inferior turbinate than after treatment of the sphenopalatine ganglion. He does not feel that such results indicate actual involvement of the ophthalmic and Meckel's ganglia, but rather that the effect is due to modification of the nervous impulses which reach the diseased cornea.

Halphen, who presented a report on this subject to the French Oto-Rhino-Laryngological Society in 1925, published a case of herpes zoster in which the pain and the course of the eruption were arrested by anesthetization of the sphenopalatine ganglion, and recently Ravler reported two cases of ophthalmic zoster cured after six and nine days, respectively, by swabbing of the entire inferior turbinate. Dubois-Poulsen used a similar treatment in eight such cases, with very limited success so far as the eruption was concerned, although some cases showed a more decided relief from pain.

Dubois-Poulsen confirms the experience of Sluder as to relief of facial neuralgia by this method. But the result was more or less fugitive and the application had to be repeated after varying intervals.

In favor of the belief that ophthalmic migraine is due to arterial spasm, Dubois-Poulsen cites the statement of Cerise and Thurel that they were able to stop spasms of the central retinal artery by anesthesia of the sphenopalatine ganglion. But Bail-

liart, Aubaret, and Jayle do not hesitate to characterize these spasms as migrainous equivalents. W. H. Crisp.

MEDICAL OPHTHALMOSCOPY

The use of the ophthalmoscope to study ophthalmoscopic evidences of general disease has only just started. Graefe, Jaeger, and Liebreich found such evidences positive and interesting eighty years ago. The ophthalmic surgeons slowly found that all we had learned of the diseases of the eye in thousands of years, had to be restudied, reclassified, given new interpretations by the light of new definite knowledge of what was revealed by the new instrument of diagnosis. A few of the neurologists, exploring the new field of injuries and diseases of the nervous system, Clifford Allbutt, Hughlings Jackson, William Gowers, and S. Weir Mitchell, realized that progress in their scientific work could be made with the ophthalmoscope.

Everywhere in the broad fields of medicine, new methods of exploration and new lines of thought are demanding attention. Very few who studied medicine in its era of rapid expansion became interested or found time to study general diseases with the ophthalmoscope. Those who were also giving attention to other branches may have learned to use the ophthalmoscope fairly well. But they have been mistaking unusual appearances that were strictly normal, for important symptoms. To give the best judgment with regard to unusual appearances, one must be constantly familiar with all the normal features of the ophthalmoscopic picture. Such familiarity with the normal fundus comes to the ophthalmologist who examines all his patients with the ophthalmoscope. Lack of it has betrayed a neurologist into seeing an optic atrophy when he was looking at a perfectly normal disc. An optometrist who got an ophthalmoscope, hoping it would bring him more customers, found a "fundus tigré" in the eye of the minister of the church he had recently joined. The gloomy prognostications this gave rise to soon led the optometrist to seek another field of activity.

For the young ophthalmologist, the opportunity to gain skill and exercise judgment in this direction is always open. He cannot know when he will discover a new sign of disease, but the ability to discriminate between slight differences of color or form can be cultivated every day; and, when the opportunity does come, that ability and practiced judgment will be needed. Whatever skill in mixing colors and reproducing them can be obtained by trial will prove useful in recording what is seen with the ophthalmoscope. The act of painting what one sees is the best way to stimulate and train powers of observation, and, as a case record, an imperfect picture generally conveys a better impression of what has been seen, than a long verbal description. In case records, photography, in black or in color, is rapidly replacing hand sketches; but success in photography requires training in observation and practice in technique.

Medical ophthalmoscopy is usually not concerned with the most striking lesions, but rather with early and slight departures from the normal. These are better seen and judged by the physician who has the broader and more constant acquaintance with the normal fundus. If to this is added a knowledge of what is new in general medicine and exact pathology, the eye physician can become a very valuable consultant in the domain of general medicine.

Medicine is developing toward the early recognition and prevention of disease, instead of its later surgical removal. The early ophthalmoscopic signs of disease

are those recent exudates of acute disease, and evidence of degenerative and vascular changes. The interior of the eye is the one part of the body in which such changes are likely to be manifest. By detecting them early, the eye physician can become an important medical consultant.

Edward Jackson.

BOOK NOTICES

BERICHT DER DEUTSCHEN OPHTHALMOLOGISCHEN GESELLSCHAFT, 1936. Edited by A. Wagenmann. Paper bound, Octavo, 530 pages, illustrated. Munich, J. F. Bergmann, 1936.

Amid the international politics thrust upon us by the daily papers, it is good to know that this scientific organization, formerly called the Heidelberg Congress, still carries on. The first session of this meeting was presided over by Professor van der Hoeve of Leiden, who received an honorary degree from the Medical Faculty of the University of Heidelberg. Other sessions were presided over by Meisner of Cologne, Müller, of Basel, Brons, of Dortmund, Holtz, of Berlin, and Riehm of Giessen.

Forty-one papers were presented and discussed at this meeting, but among the readers and discussers we find very few who have made the reputation of these meetings in the past. Notable by their presence were Lindner, of Vienna, Pillat, of Gratz, and Lauber, now of Warsaw. The papers presented were worth reading and discussing, and some of them will be permanent additions to the literature. The first three dealt with heredity. Oehlkers takes up hereditary eye conditions from the biologic standpoint; von Verschuer from the medical standpoint; and Waardenburg reviewed the field of anomalies, with reference to such characters as dominance, recessiveness, consanguinity, and so forth. The report of the discussion on this symposium occupies 28 pages.

A paper by Lauber and recent associates of Warsaw discusses the measurement of blood pressure in the retinal vessels, a subject that now seems to have a practical bearing upon the essential nature of glaucoma. Gasteiger, of Frankfurt a.M., on the histopathology of the eyes in renal-vascular disease, may also throw light on the same subject. Among the demonstrations were sections of tissue, with photographs of the patient, in a unique case—primary glioma of the orbit, in a boy three-and-one-half years old. The tumor probably started in the optic nerve. There is nothing to indicate that it was a retinoblastoma.

Edward Jackson.

AMERICAN ACADEMY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY, TRANSACTIONS OF THE FORTY-FIRST ANNUAL MEETING. Clothbound, 841 pages, illustrated. Published by the Academy, Omaha, 1937.

The present volume comprises the proceedings of the annual meeting of the Academy held in New York City, September 27 to October 3, 1936. In form and general make-up, the forty-first volume is quite similar to those of preceding years. Besides covering the scientific sessions, there are sections describing the instructional subjects, the motion pictures and the new instruments presented at the meeting. The minutes of the forty-first annual meeting are reported. There is also included a complete alphabetical and geographical directory of members.

At the joint session the president's address, presented by Dr. Frank E. Burch of St. Paul, consisted of a comprehensive discussion of the essentials of training for

ophthalmology and otolaryngology. In the address of the guest of honor, Sir John Parsons of London, ophthalmology and research stressing the necessary relationship between the basic laboratory sciences and clinical ophthalmology were discussed. In a symposium on the manifestations of cerebral nerve disease, the eye involvement was discussed by Lyle of Cincinnati, and the ear, nose and throat aspect by Jones of New York. The problem from the standpoint of the neurólogist was presented by Riley of New York.

Eleven papers were presented at the ophthalmologic sessions and the same number at the otolaryngologic sessions. Of particular interest to the ophthalmologist are the papers of Woods, Reese, and Barkan. Woods discussed the present state of knowledge on the relation of allergy to conjunctivitis and iritis, stressing the clinical applications. Reese described the histologic findings of cystic degeneration of the macula secondary to retinal detachment, which he believes is the cause for defective vision in many cases of successful operation. Barkan presented his operation of goniotomy and described further gonioscopic findings in chronic simple glaucoma.

Sarcoma of the uveal tract was discussed by McKee and pigmentation of the fundus by Bedell. The appearance and formation of the globular bodies of secondary membranes were described by Cowan and Fry. The visual sequelae of meningococcus meningitis were discussed by Heath and the use of concentrated epinephrine by Wiener and Alvis. Rones reported a case of nodular dystrophy of the cornea, Stoll one of glaucoma associated with nevus flammeus and Kiehle a case of scleromalacia. All of these papers have appeared in the current literature but only in this volume are they accompanied by the original discussion, which adds greatly to their value.

T. E. Sanders.

ABSTRACT DEPARTMENT

EDITED BY DR. WILLIAM H. CRISP

Abstracts are classified under the divisions listed below, which broadly correspond to those formerly used in the Ophthalmic Year Book. It must be remembered that any given paper may belong to several divisions of ophthalmology, although here it is only mentioned in one. Not all of the headings will necessarily be found in any one issue of the Journal.

CLASSIFICATION

1. General methods of diagnosis
2. Therapeutics and operations
3. Physiologic optics, refraction, and color vision
4. Ocular movements
5. Conjunctiva
6. Cornea and sclera
7. Uveal tract, sympathetic disease, and aqueous humor
8. Glaucoma and ocular tension
9. Crystalline lens
10. Retina and vitreous
11. Optic nerve and toxic amblyopias
12. Visual tracts and centers
13. Eyeball and orbit
14. Eyelids and lacrimal apparatus
15. Tumors
16. Injuries
17. Systemic diseases and parasites
18. Hygiene, sociology, education, and history
19. Anatomy, embryology, and comparative ophthalmology

6
CORNEA AND SCLERA

Rhodes, A. J., and Van Rooyen, C. E. **Some cytologic features of vaccinial keratitis in the rabbit.** Jour. Path. and Bacteriology, 1937, v. 44, March, p. 357.

Acidophilic inclusion bodies in the fibroblasts of the substantia propria of the rabbit cornea are induced by vaccination of the cornea. These inclusion bodies do not occur in other varieties of keratitis. It is suggested that they represent a phase in the growth of vaccinia virus. It is probable that they are colonies of the virus itself. They do not appear in rabbits immunized against vaccinia virus. Edna M. Reynolds.

Rones, B. **Nodular dystrophies of the cornea.** Trans. Amer. Acad. Ophth. and Otolaryng., 1936, 41st meeting, p. 499.

A review of the literature of the corneal and lattice dystrophies leads the author to conclude that they are merely variations of the same thing. The frequency of hyalin masses in the epithelium and the superficial lamellae would suggest this being called the characteristic change. The explanatory theories are discussed and are held to be insufficient. The author's explanation is based on the disturbed permeability of the cornea resulting from an irritative lesion of the corneal nerves. (3 figures and discussion.)

George H. Stine.

Von der Heydt, Robert. **Corneal dystrophies (types).** Amer. Jour. Ophth., 1937, v. 20, July, pp. 738-740.

7
UVEAL TRACT, SYMPATHETIC DISEASE, AND AQUEOUS HUMOR

Joy, H. H. **Prognosis of postoperative sympathetic ophthalmia.** Arch. of Ophth., 1937, v. 17, April, pp. 677-693.

This study is based on 103 cases of postoperative sympathetic ophthalmia. In 44 the diagnosis was confirmed by histologic examination. In this group, 26 were attributed to operation for cataract, 16 followed operation on the iris, and one resulted from excission of the anterior segment of the globe. Prognosis is not so unfavorable as formerly believed, although it is less favorable after cataract extraction than after other intraocular operations. Sympathetic ophthalmia following iridectomy for glaucoma is not rare and is often severe. In the few instances in which secondary operations were performed, the results indicate that the exciting eye tolerated surgical intervention well, and that the sympathizing eye could

often be operated on safely if it was properly prepared. J. Hewitt Judd.

Levkoeva, E. F. **Pathology of the sympathizing eye.** Viestnik Opht., 1937, v. 10, pt. 2, p. 203.

The sympathizing eye was enucleated and the injured eye recovered. The histologic picture was that of an intense inflammatory process without granulomatous features, necrosis, which is ordinarily absent in sympathetic ophthalmia, and a plastic exudate on the inner surface of the eyeball. The dense homogeneous character of the edema in the uvea, and the thickening of the intima, lead the author to regard this process as allergic. (Illustrations.)

Ray K. Daily.

Romanova-Bochon, O. A. **The effect of elimination of sympathetic innervation on the permeability of the ocular blood vessels.** Viestnik Opht., 1937, v. 10, pt. 2, p. 235.

A review of the literature and a report of an experimental study on rabbits. The criterion was the albumen content of the aqueous. Within the first two days after removal of the cervical sympathetic and a portion of the sympathetic trunk the albumen content of the aqueous of the experimental eye rises in comparison with the control eye. The albumen content of the reformed aqueous, following repeated puncture of the anterior chamber, is also higher than that of the control eye. After two days the content of the reformed aqueous begins to fall, indicating beginning diminution in vascular permeability. The difference in the vascular permeability of the two eyes can be demonstrated by the albumen content of the reformed aqueous as long as eight months after the operation, when the albumen content of the normal aqueous has returned to normal.

Ray K. Daily.

Vampré, Enjolras. **Adie's syndrome.** Arquivos do Instituto Penido Burnier (Brazil), 1936, v. 4, Dec., pp. 162-174.

In Brazil this is the first case to be reported of the syndrome described by Adie in 1932, a nonsyphilitic affection manifested by unilateral pupillary rigidity and absence of tendinous reflexes. The patient was a man of 27 years whose health seemed otherwise normal. The condition is nearly always unilateral. The pupillary diameter is exceptionally less than 3 mm. The pupils usually react normally to instillation of cocaine and atropin. Contraction with convergence is only produced after several seconds, but once contracted the pupil requires a rather long lapse of time to recover its original diameter. It has been suggested that the syndrome belongs to the group of diseases which are caused by a neurotropic virus. Chavany has proposed treatment with intravenous salicylate of soda.

W. H. Crisp.

With, T. K. **Uveoparotid fever as a manifestation of benign lymphogranulomatosis.** Acta Ophth., 1937, v. 15, pt. 1, p. 104.

Analyzing the data of cases reported in the literature the author finds that uveoparotid fever and benign lymphogranulomatosis are closely related in histology, bacteriology, glandular enlargements, skin lesions, tuberculin reaction, and nervous symptoms. He believes that uveoparotid fever is a local manifestation of a general lymphogranulomatosis, and that microscopic studies of the skin and mucous membranes and roentgenographic studies of the lungs and bones would add greatly to knowledge of this subject.

Ray K. Daily.

8

GLAUCOMA AND OCULAR TENSION

Babenko, I. I. **Variations in intraocular pressure of the fellow eye in ocular traumatism.** Trans. Hirschman Ophth. Inst., Kharkov, 1935, v. 3, p. 58. (See Section 16, Injuries.)

Constantine, K. W. **Lundsgaard's modification of Holth's iridencleisis.** Amer. Jour. Ophth., 1937, v. 20, July, pp. 728-730.

Cordes, F. C. **Early simple glaucoma.** Arch. of Ophth., 1937, v. 17, May, pp. 896-915.

This review includes concise discussion of normal intraocular tension, classification of glaucoma, intraocular tension in glaucoma, daily and yearly curves for tension, provocative tests (caffeine, venous congestion, massage, and darkness), visible changes in the eye together with changes in field and refraction, course and incidence of the disease, diagnosis and treatment, and general care of the patient.

J. Hewitt Judd.

Gurvich, V. A. **Gravidan in glaucoma.** Viestnik Opht., 1937, v. 10, pt. 1, p. 30.

Detailed study of 65 eyes with chronic inflammatory glaucoma showed that gravidan was harmless. In the majority of cases it improved the general condition of the patients, but only occasionally was there objective evidence of improvement in the glaucomatous condition. In cases treated with gravidan and miotics, interruption in the miotic treatment was followed by accentuation of the glaucomatous symptoms.

Ray K. Daily.

Hartshorne, Isaac. **A note on diastolic pressure and glaucoma.** Amer. Jour. Ophth., 1937, v. 20, July, pp. 724-727.

Merkulov, I. I., and Minkin, S. U. **The relation between intracranial and intraocular pressures.** Trans. Hirschman Mem. Ophth. Inst., Kharkov, 1935, v. 3, p. 20. (See Amer. Jour. Ophth., 1937, v. 20, p. 91.)

Schoenberg, M. J., and Esterman, B. **The glaucoma clinic of the Herman Knapp Memorial Eye Hospital.** Arch. of Ophth., 1937, v. 17, April, pp. 666-673.

The origin and purposes of the clinic are outlined. In addition to the ophthalmic data, complete information is being gathered from a medical and psychologic approach. The various charts used in the clinic are described.

J. Hewitt Judd.

Solanes, M. P. **Gonioscopy of the surgical colobomas of the iris.** Amer. Jour. Ophth., 1937, v. 20, July, pp. 731-737.

Stoll, K. L. **Nevus flammeus and glaucoma.** Trans. Amer. Acad. Ophth. and Otolaryng., 1936, 41st Meeting, p. 534.

This is a case report of bilateral facial nevus flammeus, with bilateral simple glaucoma, binasal hemianopsia, right hemiplegia, and other features, all of which were congenital. (2 figures, discussion.) George H. Stine.

Tillema, A. **Traumatic glaucoma.** Arch. of Ophth., 1937, v. 17, April, pp. 586-647. (See Section 16, Injuries.)

Verhoeff, F. H. **The Souter tonometer.** Amer. Jour. Ophth., 1937, v. 20, July, pp. 720-723.

9

CRYSTALLINE LENS

Bride, T. M., Duthie, O., and McNabb, H. H. **The intracapsular operation for cataract.** Trans. Ophth. Soc. United Kingdom, 1936, v. 56, p. 334.

The authors describe their experiences, and Bride gives the results in 25 cases in which the lens was extracted in its capsule; 23 without mishap, and two with rupture of the capsule while the lens was being delivered, but with good visual results. Duthie reports his experience on 65 cases. He finds less risk of iris prolapse if pilocarpin is used for 24 hours after operation. McNabb does not tumble the lens.

Beulah Cushman.

Cowan, A., and Fry, W. E. **Secondary cataract with particular reference to transparent globular bodies.** Trans. Amer. Acad. Ophth. and Otolaryng., 1936, 41st meeting, p. 509.

Six cases are illustrated and briefly reported. Ten pathologic specimens are also reproduced. (16 figures, discussion.) George H. Stine.

Duthie, O. M. **Operative treatment in a case of familial bilateral dislocation of the lens.** Trans. Ophth. Soc. United Kingdom, 1936, v. 56, p. 338.

A woman 29 years old had dislocation of the lenses upward and inward. In 1932 a discission was performed on the right eye with a Ziegler knife, the lens

being fixed with a stop needle. In 1934 the second eye was operated upon. While the lens was being fixed with the stop needle it was displaced into the anterior chamber. It was immediately removed through a corneal section.

Beulah Cushman.

Ernsting, H. C. **Modified subconjunctival extraction of cataract.** A preliminary report. Arch. of Ophth., 1937, v. 17, April, pp. 674-676.

A conjunctival flap, approximately 6 by 4 mm., is made at the upper limbus and dissected free from the underlying tissues down to the limbus. The conjunctiva on each side of the flap is undermined to the limbus as far as the 3-o'clock and 9-o'clock positions. A keratome incision is made in the limbus and is enlarged under the conjunctival flap on each side by scissors. Extraction is then performed in the usual manner and the flap replaced. No sutures are used.

J. Hewitt Judd.

Gifford, S. R., and Puntenney, I. **Coralliform cataract and a new form of congenital cataract with crystals in the lens.** Arch. of Ophth., 1937, v. 17, May, pp. 885-892.

The character of the lenticular opacities was investigated by microchemical methods. The results indicate that chemical changes may occur which result in the formation of crystals in the lens. In the second case reported, crystals of a salt of calcium, probably calcium sulphate, were found and were responsible for the opacity, which resembled an ordinary zonular cataract except that the concentric zones of denser opacities were formed by crystals. In the first case reported, the crystals were thought to be of a similar nature, although the material was insufficient for complete analysis.

J. Hewitt Judd.

Lamb, H. D. **Anterior capsular cataract.** Arch. of Ophth., 1937, v. 17, May, pp. 877-881.

Two cases are reported in which at the periphery of the capsular cataract was observed proliferation of the cells of the anterior epithelium of the lens with transition of these proliferated cells to typical fibroblasts. The formation of connective tissue in the capsular cataract is an example of true metaplasia from the pure ectodermal epithelium. (Photomicrographs.)

J. Hewitt Judd.

Lijo Pavia, J. **Hand-operated vacuum extractor of cataract.** Rev. Oto-Neuro-Oft., 1937, v. 12, April, p. 102; also Arch. de Oft. de Buenos Aires, 1937, v. 12, March, p. 147.

The author describes a third model, with some improvements on the preceding two (see Amer. Jour. Ophth., 1937, v. 20, p. 445), and believes that the strictures of the Barraquer erisiphake and of the Arruga and Lijo Pavia hand-operated apparatus are not justified.

M. Davidson.

Porte, G. **Intracapsular cataract extraction by the Hungarian method.** Ann. d'Ocul., 1937, v. 174, April, pp. 248-254.

The method of cataract extraction used by de Grosz of Budapest is described. A relatively small corneal section is made with conjunctival flap. A complete iridectomy is done. The upper portion of the lens is grasped with forceps and the zonule is ruptured by lateral rocking. The lens is delivered without tumbling by traction combined with light pressure. No sutures are used. The two outstanding features of the technique are complete iridectomy and removal of the lens by traction on the upper portion. Porte summarizes his results in 57 extractions.

John C. Long.

Vecchi, I. de. **The content of amino-acids in the lens in naphthalene intoxication.** Rassegna Ital. d'Ottal., 1936, v. 5, Sept.-Oct., p. 552.

Having found the amino-acid content higher than normal in human cataracts, the author studied the chemical changes produced in naphthalene cataracts in rabbits. He found that the percentage increased from 35.98 percent in normal lenses to 39.2 percent in completely opaque lenses and inclines to the belief that the increase results from a process

of hydrolytic breaking down of the lenticular protein. Eugene M. Blake.

10

RETINA AND VITREOUS

Anderson, R. G., and Gray, E. B. **Spasm of the central retinal artery in Raynaud's disease.** Arch. of Ophth., 1937, v. 17, April, pp. 662-665.

The literature is reviewed, and the case is reported of a man aged 39 years in whom spasm of the retinal arteries resulted in the typical fundus picture of embolism of the central retinal artery. Cervical sympathectomy was advised but refused. Treatment consisting of large doses of potassium iodide produced no improvement in vision.

J. Hewitt Judd.

Askalonova, T. M. **Normal and toxic action of plasmocide on the retina.** Viestnik Opht., 1937, v. 10, pt. 1, p. 91.

Experimental study on rats showed that the range between the therapeutic and the toxic dose was very small, and slight excess of the therapeutic dose led to degenerative changes in the retina.

Ray K. Daily.

Cohen, Martin. **Lesions of the fundus in polycythemia.** Arch. of Ophth., 1937, v. 17, May, pp. 811-818.

Seven cases are reported, among which five were of the primary type and presented normal vision except in one instance. The retinal veins were distended and purplish, and the retinal arteries were of normal caliber and color. Fundus complications occurred in two cases. In the two cases of the secondary type the retinal veins were markedly distended and bluish, and the retinal arteries were moderately distended and purplish. In both cases there were no fundus complications and vision was normal. It is pointed out that ophthalmoscopic examination may be an additional diagnostic aid in the early stages of both types. (Fundus drawings.) J. Hewitt Judd.

Evans, P. J. **Congenital fold of the retina.** Trans. Ophth. Soc. United Kingdom, 1936, v. 56, p. 344.

In a patient 19 months old the right eye was removed with a diagnosis of pseudoglioma, but the pathologic diagnosis was congenital fold of the retina. The left eye showed a gray band passing from the outer side of the optic disc across the macular area and terminating in the region of the ciliary processes. Histologic study of the retina in the enucleated eye showed incomplete differentiation of the ganglion-cell and nerve-fiber layers, while the rods and cones were poorly developed. Hyaloid remnants were seen within the fold.

Beulah Cushman.

Farina, Ferdinando. **Etiology and pathogenesis of retinitis pigmentosa.** Rassegna Ital. d'Ottal., 1936, v. 5, Sept.-Oct., p. 566.

The author describes the case of a woman of thirty years who developed retinitis pigmentosa, which was probably related to an ovarian-hormone disturbance, and which was treated with good result by plurivalent opotherapy. Because of a parenchymatous metritis and salpingitis, a complete hysterectomy was done. Cranial radiograms showed a small sella and lamina quadrilatera pushed forward. Two other cases in the recent Italian literature where anterior pituitary extract was employed with marked benefit suggest an etiologic relationship between glandular disturbances and retinitis pigmentosa, admitting a special local predisposition to pathology.

Eugene M. Blake.

Hecht, Selig. **Rods, cones, and the chemical basis of vision.** Physiological Reviews, 1937, v. 17, April, p. 239.

A thoroughgoing review of all recent data describing visual functions is given and it is shown that all the material falls into the pattern of the duplicity theory which separates vertebrate vision into cone function and rod function. Edna M. Reynolds.

Jeghers, Harold. **Night blindness as a criterion of vitamin-A deficiency.** Ann. of Internal Med., 1937, v. 10, March, p. 1304.

The author reviews the literature

dealing with the physiology, biochemistry, pathology, and clinical aspect of vitamin-A deficiency. On the basis of his studies he concludes that hemeralopia is the earliest and most constant manifestation of vitamin-A deficiency in adults and may exist for years as the only manifestation of vitamin-A deficiency. In 274 adults studied with the photometer, a moderate degree of vitamin-A deficiency was found in supposedly healthy persons. Vitamin-A deficiency may occur if any condition is present which (a) increases metabolism for vitamin A, such as fever, infection, increased basal metabolic rate, or pregnancy, (b) interferes with proper absorption from the gastrointestinal tract, or (c) interferes with conversion of carotene or storage of vitamin A in the liver. Vitamin-A deficiency is a constant feature of liver disease and does not correct itself by the usual oral doses of vitamin A. Theodore M. Shapira.

Lange, Oswaldo. **Indications for rachicentesis in treatment of hypertensive retinitis.** Arquivos do Instituto Penido Burnier (Brazil), 1936, v. 4, Dec., pp. 207-211.

In three patients whose cases are related, evacuation of spinal fluid, together with general medication, favorably influenced the ophthalmoscopic signs and was followed by a corresponding improvement in visual acuity. W. H. Crisp.

Sedan, J., and Jayle, G. E. **Considerations on spasms of the central retinal artery.** Ann. d'Ocul., 1936, v. 173, Aug., pp. 609-636, Nov., pp. 865-888, and 1937, v. 174, Feb., pp. 73-107.

This is a detailed classification and discussion of spasms of the central retinal artery. They may be recurrent, prolonged, or mixed in type. The recurrent may be classified as follows: (1) retinal migraine; and (2) recurrent amblyopias from various causes: (a) diseases of the nervous system such as epilepsy, (b) intoxication, (c) in the course of general diseases, (d) local ocular conditions such as glaucoma, myopia, and occlusion of the central vein, and (e) of dental or nasal origin.

Visual disturbances associated with spasms of mixed form may be found in hypertension or arteritis. Prolonged visual disturbances of spasmotic origin may be classified as follows: (1) with the appearance of embolism in the central artery or one of its branches, (2) with the appearance of simple optic atrophy, (3) as a complication of lead poisoning, (4) associated with papillitis or retrobulbar neuritis, (5) multiple segmentary spasms. The various types are illustrated by case reports from the literature. John C. Long.

Spector, S. A., and Sokolov, D. D. **Laurence-Biedl syndrome.** Viestnik Opht., 1937, v. 10, pt. 2, p. 258.

To 73 cases collected from the literature by Reilly and Lisser the author adds one. The patient had polydactylism, adiposogenital dystrophy, mental retardation, and retinitis pigmentosa. Ray K. Daily.

11

OPTIC NERVE AND TOXIC AMBLYOPIAS

Balser, B. H. **Neuromyelitis optica.** Brain, 1936, v. 59, Oct., p. 353.

The author discusses the history of neuromyelitis optica and describes four cases, all females. He shows the similarity between the disease and acute disseminated sclerosis. In neuromyelitis optica disturbances of vision are bilateral and may progress rapidly to complete blindness. Pathologically neuromyelitis optica is characterized by an asymmetrical diffuse demyelinization of the cord, brain stem, and optic nerves and tracts. M. E. Marcove.

Bender, M. B., and Strauss, I. **Defects in visual field of one eye only in patients with a lesion of one optic radiation.** Arch. of Ophth., 1937, v. 17, May, pp. 765-787.

The authors discuss the anatomy of the fibers of the temporal crescent in the visual pathways and present eleven cases in which a lesion of the optic radiation produced an unpaired crescentic or hemicrescentic defect in the periphery of the temporal field of vi-

sion. It is suggested that the fibers in the optic radiation have a lamellar arrangement, since in four cases an unpaired crescentic relative scotoma was found mesial to the peripheral crescentic absolute scotoma. Homonymous anopias usually begin in the periphery and advance toward the center irrespective of the location of the lesion. The functional and structural bases for these phenomena are explained. An unpaired peripheral temporal scotoma has localizing value in early diagnosis of tumor of the brain, indicating an early defect in the optic radiations.

J. Hewitt Judd.

Brandi, A. J. **The cerebrospinal fluid in isolated luetic optic atrophies.** Arquivos do Instituto Penido Burnier (Brazil), 1936, v. 4, Dec., pp. 239-244.

With five case reports, the author discusses questions of diagnosis and treatment.

Dawson, W. T., Permar, H. H., Johnston, J. M., and Maclachan, W. W. G. **An experimental study of the variations in the production of visual disturbance by certain new cinchona derivatives.** Amer. Jour. Med. Sciences, 1937, v. 193, April, p. 543.

These cinchona derivatives have been used in the treatment of pneumococcus pneumonia. The retinae of dogs injected subcutaneously with large doses of ethylhydrocupreine ethylapocupreine, isopropylapocupreine or quinine showed damage to the ganglion cell layers. In ten dogs injected with hydroxylethylapocupreine there was no damage at all. Theodore M. Shapira.

Dosorzeva, P. M., and Krasnov, M. L. **Experimental data on the prophylaxis and treatment of plasmocide complications.** Viestnik Opht., 1937, v. 10, pt. 1, p. 84.

Experimental study on rabbits leads the authors to propose clinical administration of plasmocide in combination with small doses of caffein. The angiospasm caused by plasmocide can be averted by caffein without diminishing the antimalarial properties of the drug.

Ray K. Daily.

Duggan, W. F. **Acetylcholine in the treatment of acute retrobulbar neuritis.** Arch. of Ophth., 1937, v. 17, April, pp. 579-585.

The chemistry and physiology of acetylcholine are briefly reviewed and its importance as a vasodilator in treatment of acute retrobulbar neuritis is pointed out. Two cases which were treated solely by this method are reported. In the first, vision improved from 20/40 to 20/20 in ten days, and in the second from 8/200 to 20/25 in five days. (Discussion.) J. Hewitt Judd.

Grosz, Stephen de. **Dimethyl-sulphate poisoning in relation to ophthalmology.** Amer. Jour. Ophth., 1937, v. 20, July, pp. 700-707.

Hagedoorn, A. **The chiasmal syndrome and retrobulbar neuritis in pregnancy.** Amer. Jour. Ophth., 1937, v. 20, July, pp. 690-699.

Krasnov, M. L., Levkoeva, E. F., Dosorzeva, P. M. **Clinical, experimental, and anatomo-pathologic effect of plasmocide on the eye.** Viestnik Opht., 1937, v. 10, pt. 1, p. 73.

From a review of the literature and the author's experimental investigation on dogs they conclude that plasmocide, although a valuable antimalarial preparation, is highly toxic, with the therapeutic bordering on the toxic dose. The pathogenesis of ocular involvement consists in the direct effect of plasmocide on the vascular system of the eye, and on the nerve elements of the retina and optic nerve. The early vascular change is an angiospasm with ischemia of the tissue. Next come changes in the vascular wall, hyperemia, and inflammatory phenomena. The attack on the nerve elements centers primarily on the ganglion cells of the retina with consequent ascending optic atrophy.

Ray K. Daily.

Longo, P. W. **Result of malaria therapy in luetic atrophy of the optic nerve.** Arquivos do Instituto Penido Burnier (Brazil), 1936, v. 4, Dec., pp. 183-206.

Out of twenty cases so treated, thirteen showed improvement in visual

acuity, two of these showing extraordinary improvement. Five cases showed arrest of the atrophic process, with the vision stationary. Two cases showed deterioration of vision. All the patients showed great improvement in general condition, even those whose vision got worse. These cases of visual deterioration were in patients whose vision was practically abolished when the treatment was begun. (20 detailed case reports.) W. H. Crisp.

Merkulov, I. I., and Bereshnaya, A. G. **Dark adaptation in optic neuritis and in choked disc.** Trans. Hirschman Mem. Ophth. Inst., Kharkov, 1935, v. 3, p. 45.

An analysis of dark adaptation curves, obtained with the Nagel adaptometer, of seven patients with optic neuritis and five patients with choked disc shows impairment in dark adaptation in optic neuritis, and normal adaptation in choked disc, except in its advanced stages. Testing of dark adaptation is therefore of value in differential diagnosis between optic neuritis and choked disc. Ray K. Daily.

Persky, Abram H. **Retrobulbar neuritis of sinus origin.** Med. Record, 1936, v. 144, Oct. 21, p. 364.

The author presents a case of progressive unilateral retrobulbar neuritis. There was a history of nasal sinus disease but no pathology was located by either direct or X-ray examination. A diagnostic ethmosphenoidectomy was performed, but no pus was found. The next day the vision began to improve and in two months was restored to normal. M. E. Marcove.

San Mindlin, Henrique. **Early syphilitic disturbances of the optic nerve.** Arquivos do Instituto Penido Burnier (Brazil), 1936, v. 4, Dec., pp. 226-229.

During the active secondary stage, in the presence of papulo-macular cutaneous lesions, the patient presented papilledema in the right eye and an edematous neuritis in the left eye. Recovery followed specific treatment.
W. H. Crisp.

Sherman, G. C. **Optic atrophy following administration of plasmocide.** Viestnik Opht., 1937, v. 10, pt. 1, p. 95.

A report of fifteen cases, and a warning against administration of plasmocide under inadequate supervision.
Ray K. Daily.

Shlain, V. V. **The action of plasmocide on the eye.** Viestnik Opht., 1937, v. 10, pt. 1, p. 101.

A report of a case observed within the first few days of plasmocide poisoning. The fundus picture was that of embolism of the central retinal artery with a cherry spot at the macula; no light perception. Five months later the fundus periphery was normal, and there was pronounced temporal atrophy of the optic nerve with narrowing of the vessels; vision 1/100.
Ray K. Daily.

12

VISUAL TRACTS AND CENTERS

Hartman, E., and Guillaumat, L. **Ocular symptoms of suprasellar meningiomas.** Ann. d'Ocul., 1937, v. 174, Jan., pp. 1-39.

This is a review of the ocular findings in 21 proven cases of suprasellar meningioma. The fundi were normal in only one case. Optic atrophy or papilledema were almost constant. One typical and two atypical Foster-Kennedy syndromes were encountered. Marked reduction in visual acuity was noted and also extensive field defects. In fifteen cases there was a bitemporal contraction. In one case each there occurred homonymous hemianopsia, horizontal hemianopsia, and concentric contraction with central scotoma. Postoperative studies on the fourteen surviving patients showed improvement in the visual fields with less rapid and less constant improvement in central vision.
John C. Long.

Poljak, S., and Rei Hayashi. **Cerebral representation of the retina in the chimpanzee.** Brain, 1936, v. 59, March, p. 51.

The authors substantiate the clinical findings that the retinal fibers corre-

sponding with the upper and lower quadrants end in the medial and lateral segments of the lateral geniculate bodies. Theodore M. Shapira.

Rosenbaum, J. **Optic encephalomyelitis.** Arch. of Ophth., 1937, v. 17, April, pp. 694-697.

This comparatively rare condition was found in a woman aged 34 years. There was rapid loss of vision in the left eye with no recovery, and loss of vision in the right eye with partial recovery. Paralysis of the right leg and of the abdominal muscles ensued four months after onset of the disease in the optic pathway. During the illness there was a marked leukopenia.

J. Hewitt Judd.

13

EYEBALL AND ORBIT

Atkinson, F. R. B. **Schuller-Christian's disease.** Brit. Jour. Children's Dis., 1937, v. 34, Jan.-March, p. 28.

The author gives a summary of 103 cases and 22 autopsies reported in the literature. The symptoms which characterize the disease are (1) osteoporosis, (2) exophthalmos, and (3) diabetes insipidus. Lipoid granulomata in the fundus, conjunctiva, and cornea; optic neuritis; choked discs; atrophic discs; and crossed diplopia have also been observed. Edna M. Reynolds.

Cavallacci, G. **Hypophyseal-diencephalic syndromes with congenital microphthalmos.** Arch. di Ottal., 1937, v. 44, Jan., p. 1.

(The entire issue is reserved to this article.) The author describes two cases of a syndrome characterized from the ocular point of view by bilateral microphthalmos and from the general physical viewpoint by pituitary diencephalic dysfunction, which in one case was in the form of diencephalic pituitary adiposity, and in the other case, hypophyseal infantilism with adiposogenital dystrophy of the Fröhlich type. The author believes both the microphthalmos and the pituitary and diencephalic alterations are well explained on an embryologic and congenital basis. He suggests that the Lawrence-Biedl syndrome may be explained on the same basis. (Bibliography.)

H. D. Scarney.

Damel, C. S. **Radiographic images in some affections of the eyeball.** Trabalhos do Primeiro Congresso Brasileiro de Ophth., 1936, v. 1, pp. 57-66.

The author reports the X-ray findings in ten eyes with phthisis bulbi. These eyes showed definite shadows in the roentgenogram corresponding to calcification of the lens or the choroid. (Bibliography.) Ramon Castroviejo.

Davis, D. B., and King, J. C. **Oxycephaly.** Radiology, 1937, v. 28, April, p. 490.

The case presented the outstanding symptoms of a steeply rising forehead with a dome-like apex at the site of the anterior fontanel associated with exophthalmos. There was no divergent squint. The author suggests that X-ray plates of the skull be secured to rule out oxycephaly in all cases of unexplained exophthalmos associated with a slight skull deformity or with a divergent squint. Edna M. Reynolds.

Franceschetti, A., and Rutishauser, E. **Inflammatory pseudotumors of the orbit (Birch-Hirschfeld).** Graefe's Arch., 1937, v. 137, pt. 1, p. 93.

Of four cases described two presented follicles. In two the tubercle bacillus was demonstrated. In one case, tuberculosis (human type) was determined through injection of tumor fragments into guinea pigs. The authors think too little attention has been paid to animal injections in investigation of pseudotumors of the orbit. In three cases the inflammation extended from the lacrimal gland. Biopsy and not total extirpation should first be performed. Conservative measures (those promoting absorption and the X ray) should prevail. Only where there exists definite danger to the eyeball from the growth should a radical procedure be undertaken.

H. D. Lamb.

Freiberger, Moses. **The gold-ball implant.** Arch. of Ophth., 1937, v. 17, May, pp. 882-884.

The author stresses the importance of completely closing Tenon's capsule, careful hemostasis, and a ball which is not more than 14 mm. in diameter. A method of closing Tenon's capsule by overlapping of the margins is described.

J. Hewitt Judd.

Plummer, F. D. **Hyperplasia of the lymphoid tissue of the orbits.** Trans. Ophth. Soc. United Kingdom, 1936, v. 56, p. 304.

A woman aged 62 years developed severe bilateral straightforward proptosis. All general and local examinations were negative. Finally thyroid extract was given and the exophthalmos steadily decreased. Beulah Cushman.

Rosenbaum, J. **A case of malignant exophthalmos.** Canadian Med. Assoc. Jour., 1937, v. 36, Jan., p. 12.

A case of exophthalmos is described in which a painstaking examination failed to reveal the cause. Because of defective ocular movements, ulceration of both corneae, and beginning optic atrophy, decompression of the orbits was done. Ten days after operation the ulcer of the right cornea perforated with slight iris prolapse. Within three weeks after operation the exophthalmos had improved to such an extent that the corneae were well covered by the eyelids during sleep. Vision was reduced to 20/120 in the right and to 20/60 in the left eye.

Edna M. Reynolds.

Sharkovskii, I. **The Dagnini-Aschner oculocardiac pressure reflex in orbital hematomas following enucleation.** Viestnik Opht., 1937, v. 10, pt. 2, p. 255.

A report of three cases of orbital hematoma following enucleation, accompanied by symptoms of cardiovascular collapse similar to that induced experimentally by pressure on the eyeball. Ray K. Daily.

Smelser, G. K. **Experimental production of exophthalmos resembling that found in Graves' disease.** Proc. Soc. Exper. Biology and Med., 1936, v. 35, Oct., p. 128.

The author produced experimental exophthalmos by injecting beef anterior-lobe extract into guinea pigs. The thyroid and left ganglion were removed. Protrusion of the eye was usually noted from twelve to twenty days after the first injection. The exophthalmos was due to an increase in the orbital contents of as much as forty percent. The exophthalmos was bilateral, although only the left sympathetic ganglion was removed. The author concludes that because of this the exophthalmos was independent of the cervical stimulation.

M. E. Marcove.

Thomas, H. M., Jr., and Woods, A. C. **Progressive exophthalmos following thyroidectomy.** Bull. Johns Hopkins Hosp., 1936, v. 59, Aug., p. 99.

Various theories of the causation of exophthalmos in Graves' disease are discussed and fifteen cases of progressive exophthalmos following thyroidectomy are reported. In each of these cases thyroidectomy relieved all the symptoms except the exophthalmos, which gradually grew worse. In one case bilateral enucleation was necessary and the orbital contents continued to hypertrophy and finally bulged out between the eyelids.

Microscopic examination of sections from extraocular muscles in cases of hyperthyroidism shows the presence of lymphocytic germinal centers similar to those found in the thyroid gland in hyperthyroidism. These centers may be a contributing factor in the production of exophthalmos.

Edna M. Reynolds.

Tolosa, A., and Araujo, O. P. de. **New contribution to the study of syphilitic lesions of the orbit.** Arquivos do Instituto Penido Burnier (Brazil), 1936, v. 4, Dec., pp. 175-182.

The patient, a woman of 22 years, came on account of pain in the region of the teeth and severe inflammation of the left upper jaw. There was loss of bony substance in the region of the left maxillary sinus. There were a number

of evidences of hereditary syphilis, including absence of the bony bridge of the nose, and positive Wassermann and Kahn reactions. There was bony absorption of the anterior part of the orbit. Symptomatic cure resulted from the use of bismuth. W. H. Crisp.

Velhagen, K., Jr. **Diagnosis of fractures in the wings of the sphenoid bone.** Arch. f. Augenh., 1937, v. 110, March, p. 365.

The author describes a case in which the X-ray findings simulated fracture in the orbital wall. This prompted the author to make an extensive study of the variations in the course of the sutures in the orbital wall, and he groups the findings under three main types. He further calls attention to the presence in this region of numerous sesamoid bones which add to the confusion in X-ray diagnosis. R. Grunfeld.

14
EYELIDS AND LACRIMAL APPARATUS

Bushmich, D. G. **The treatment of scrofulous ocular diseases with intramuscular injections of cod-liver oil.** Sovietskii Viestnik Opht., 1936, v. 9, pt. 4, p. 482.

In 48 cases of scrofulous blepharoconjunctivitis and meibomitis this treatment gave excellent results.
Ray K. Daily.

Gardilčić, Ante. **The concentration of hydrogen in the tears in a native condition and in the conjunctival secretion, electrometrically measured in a case with freely exposed excretory ducts of the lacrimal gland. The conjunctiva as an important producer of the alkaline reaction.** Graefe's Arch., 1937, v. 137, pt. 1, p. 71.

As the result of scarring from lupus, the right eyelids developed free exposure of the outlets of the lacrimal ducts. This is the first time that lacrimal fluid unmixed with conjunctival secretion has been obtained. Measurements with the capillarelectrometer of the native lacrimal fluid, of the secretion of the inflamed conjunctiva of the right eye, and of the secretion from the normal conjunctiva of the left eye of this patient showed that the conjunctival glands produce a secretion even more alkaline than that of the lacrimal gland itself. H. D. Lamb.

Georgariou, P. M. **A unilateral hereditary and congenital case of irritation of the cervical sympathetic nerve.** Klin. M. f. Augenh., 1937, v. 98, March, p. 306.

From birth, a girl's left upper lid was 3 mm. higher than the right and did not follow the eye in looking downward. The left pupil was not dilated and there were no secretory disturbances. The genealogic tree showed that the phenomenon had been observed in four other members of the family. The retinal vessels of the right eye were slightly narrowed. In discussing the case the author attributes the condition to a slight congenital anomaly in the tissue or blood vessels, which caused chronic irritation at a certain point in the cervical sympathetic. The laws of its hereditary transmission from generation to generation are not known. C. Zimmermann.

Green, John. **Excision of the chalazial sac through conjunctival incision.** Amer. Jour. Ophth., 1937, v. 20, June, p. 627.

Heath, Parker. **Instruments for lid treatment.** Trans. Sec. on Ophth., Amer. Med. Assoc., 1936, 87th session, p. 272; also Arch. of Ophth., 1937, v. 17, May, pp. 894-895.

There are illustrated a sharp needlepoint and a blunter punctum dilator, an instrument for massage and expression of the meibomian glands, a conjunctival-flap dissector, a series of ring curettes, a chalazion clamp that will not compress the lid border, and an applicator holder. George H. Stine.

Kreibig, Wilhelm. **Spectacles for blepharospasm.** Zeit. f. Augenh., 1937, v. 91, March, p. 289.

The author describes a spectacle frame with springs soldered to its posterior surface, which he has found suc-

cessful in treatment of four out of five cases of blepharospasm which failed to respond to other therapy. The springs must be sufficiently soft to allow occasional closure of the lids and must be applied to the nasal edge of the frame. On the temporal side lid pressure is so great that the spastic muscle displaces the entire rim.

F. Herbert Haessler.

Medvedjev, N. I. **Surgical treatment of trichiasis.** Trans. Hirschman Mem. Ophth. Inst., Kharkov, 1935, v. 3, p. 112.

A detailed report of three cases of trachomatous trichiasis treated by implantation of a conjunctival strip into the intermarginal space.

Ray K. Daily.

Michail, D. **Researches on the lesions provoked by inoculation of trachomatous virus in Harder's gland.** Bull. Acad. de Méd. de Roumanie, 1936, v. 1, no. 2, pp. 283-289.

The changes found three days after inoculation were such as might be attributed to reaction toward any sort of foreign albumen. The changes found in glands extirpated five days after inoculation of the trachomatous virus showed a lymphocytic infiltration around the vessels and in slender columns between the acini. This reaction was regarded as specific to the trachomatous virus. Glands extirpated ten days after inoculation of trachomatous virus showed, along the interlobular conjunctival septa, in addition to initial lymphatic follicles with lymphocytes, typical mature lymphatic follicles, with germinating centers formed of epithelioid cells some of which were in mitotic proliferation. These appearances were regarded again as specific toward the trachomatous virus. Glands extirpated fourteen days after inoculation showed reduced infiltration not merely of the interlobular septa, but also of the finer septa which separate the glandular acini. This was in association with marked desquamation of the epithelium of the acini, evidently a beginning atrophy of Harder's glands. After 45, 61, and 75 days, the inoculated glands showed insular destruction of the acini, due to interacinous sclerosis which replaced groups of acini by small zones of spongy conjunctival tissue, again part of an atrophic process.

W. H. Crisp.

Skydsgaard, Henning. **Bilateral tuberculous dacryoadenitis.** Acta Ophth., 1937. v. 15, pt. 1, p. 128.

The patient, a man of 33 years, had a hard, lobulated, mobile growth in the temporal portion of each eyelid. The diagnosis was made microscopically. The literature contains about thirty case reports of tuberculosis of the lacrimal glands. Ray K. Daily.

Strachov, B. P. **Remarks on extirpation of the lacrimal sac.** Sovietskii Viestnik Opht., 1937, v. 9, pt. 4, p. 507.

The author sections the internal canthal ligament at the crista lacrimalis and separates the anterior wall of the lacrimal sac first. He isolates the sac by sharp dissection and cuts it off in the nasal canal. Ray K. Daily.

Villard, M. H. **The danger from injection of caustics in treatment of infections of the lacrimal passages.** Bull. Soc. Franç. d'Opht., 1936, v. 49, pp. 61-65.

In two cases very serious results followed such injection. The first patient had a chronic dacryocystitis on the left side. After cocaine, adrenalin, and sterile water, the author injected a solution of two-percent chromic acid. Some of the solution escaped into the neighboring tissues. The author recognized the necessity of immediate attention and made a deep incision into the tissues. In spite of this, phlegmon of the orbit resulted which necessitated incision. After many months the patient presented marked cicatricial ectropion of the lower lids. The vision was unimpaired.

In the second patient a two-percent silver-nitrate solution had been injected into the tear sac. A short time later the patient began to have severe pain. Later phlegmon of the orbit developed. There was rapid loss of vision of the left eye, and an orbital incision

was necessary. The vision improved to one or two tenths.

Clarence W. Rainey.

Wibo and Janssens. **Clinical study and radiology of a rare malformation of the lacrimal passages.** Bull. Soc. Belge d'Opht., 1936, no. 73, p. 128.

Obstruction of the lacrimal passages existed in one eye. There were two nasolacrimal canals one of which ran a normal course and the other emptied into the maxillary sinus. There was insensibility of the posterior wall of the pharynx and of the soft palate on the side of the anomaly. The patient presented marked facial asymmetry. Two members discussing the report refused to accept the diagnosis of malformation, basing their doubts on the embryology of the lacrimal passages, and one offered a diagnosis of "false passage." J. B. Thomas.

15

TUMORS

Almeida, A. de, and Salas, M. **Epibulbar tumors.** Rev. Oto-Neuro-Oft., 1937, v. 12, April, p. 89.

Nine cases of epibulbar carcinomata are reported and illustrated with photomicrographs. In two the eyes had to be sacrificed. Conservative surgery is advocated as generally successful.

M. Davidson.

Badot, J. **A comparative study of some cases of malignant tumor of the lids, conjunctiva, and cornea.** Bull. Soc. Belge d'Opht., 1936, no. 73, p. 65.

The author reports three cases. He concludes that epithelioma of the lids, often of the basocellular type, is very sensitive to X rays and is readily cured by them. Epithelial neoplasms of cornea and conjunctiva have an entirely different evolution and may or may not yield to X-ray treatment. In discussing this paper Weekers reported excellent results with radium treatment of epithelioma of the lids, but he had adopted diathermy with advantage in certain types of epithelioma.

J. B. Thomas.

Black, George. **Fibroma of cornea produced by tattooing at site of excised dermoid.** Trans. Ophth. Soc. United Kingdom, 1936, v. 56, p. 263.

A fibroma developed in the area of tattooing after seventeen years, and it recurred after removal of the marks by diathermy. Beulah Cushman.

Bokermann, Ludwig. **Cure of retinal glioma by means of roentgen rays.** Zeit. f. Augenh., 1937, v. 91, April, p. 348.

The author reports a case of bilateral retinal glioma in which one eye was enucleated and the other healed after heavy divided doses of roentgen rays. Eight successfully treated patients had been reported up to 1934. The prognosis is not favorable. Therefore, this form of therapy should still be limited to those glioma patients who have bilateral lesions and where the eye with the more advanced lesion has been enucleated. F. Herbert Haessler.

Ehlers, Holger. **Epibulbar lymphocytoma.** Det oftalmologiske Selskab i Köbenhavn's Forhandlinger, 1935-1936, pp. 21-26. In Hospitalstidende, 1936, Dec. 15.

Two patients, 23 and 24 years of age respectively, are described, each of which had a yellowish-red tumor mass lying on the sclera 8 mm. above the limbus and pushing the unbroken conjunctiva forward. The tumors had a sagolike, semitransparent appearance. Biopsies and microscopic examination revealed a cellular structure which placed the tumors in the class of lymphocytoma. Both tumors yielded to roentgen-ray exposure and disappeared entirely in from three to six weeks.

D. L. Tilderquist.

Ernsting, H. C. **Boeck's sarcoid of the eyelid with coexisting Darier-Roussy's sarcoid.** Arch. of Ophth., 1937, v. 17, March, pp. 493-504.

A woman aged 22 years presented Boeck's type of sarcoid in the eyelid, Darier-Roussy's subcutaneous type in the leg, and parenchymal infiltration in the chest. The etiology is unknown. Histologic study is the only accurate means of diagnosis. Treatment con-

sisted of removal of the tumor from the lid, administration of potassium arsenite, and roentgen therapy of chest and breast. Prognosis is good as a rule. In the case reported there had been no recurrence after eight months.

J. Hewitt Judd.

Gama, Carlos. **The Foster-Kennedy sign in tumors of the frontal pole.** Arquivos do Instituto Penido Burnier (Brazil), 1936, v. 4, Dec., pp. 212-225.

Out of 66 intracranial tumors operated upon by the author, 26 were located in the frontal pole. Of these 11 constitute the basis of the present study. The Kennedy sign (retrobulbar neuritis followed by optic atrophy on the side of the lesion, with papilledema on the other side) was encountered seven times. W. H. Crisp.

Hagedoorn, A. **Paget's disease of the eyelid associated with carcinoma.** Brit. Jour. Ophth., 1937, v. 21, May, pp. 234-241.

A patient of 56 years, affected from childhood with trachoma and xerosis, came on account of pain in the left eye. After two years conservative treatment the left eye was excised upon the appearance of a subcutaneous nodule proved by histologic examination to be carcinoma simplex. The point of origin could not be determined, because of the advanced stage of the case. (9 photographic figures.)

D. F. Harbridge.

Lane, L. A. **An occupational study of cancer of the eye and adnexa.** Surgery, Gynecology, and Obstetrics, 1937, v. 64, Feb. 15, p. 458.

One thousand cases form the basis of this study. The highest percentage of cancer of the eye was found in patients whose occupation was sedentary in character and presented no occupational hazards. Increased distribution of cancer of the eye was found in occupations with exposure to sunlight and to oils. The carcinomatous lesions were confined largely to the adnexa while the sarcomatous lesions occurred most frequently in the choroid and orbit.

Cancer of the eye is not on the increase. The number of malignancies of the eye is almost constant year after year except that the years immediately following influenza epidemics show a distinct rise in the number of sarcomata. From the data of this study it appears that ophthalmologists are making a mistake not to employ radiotherapy either alone or combined with surgery in all malignant tumors of the eye. Edna M. Reynolds.

Lundberg, A. **Primary glioma of the optic nerve and chiasm.** Arch. d'Opht. and Rev. Gen. d'Opht., 1937, v. 1, n. s., Feb., p. 97.

The author reports in detail, with histologic studies, nine cases of glioma of the optic nerve and chiasm. The belief that they belonged to the group of oligodendrocytomata concurred well with their relative benignity. (Illustrations, bibliography.) Derrick Vail.

Marzio, Quirino di. **Tumors of the orbit: orbito-fronto-ethmoidal osteomata.** Riv. Oto-Neuro-Oft., 1936, v. 13, Sept.-Oct., pp. 393-430.

The author reports four cases of frontal and ethmoidal osteoma which protruded into the orbit provoking marked exophthalmos. The age of the patients, three of whom were male, varied from 17 to 27 years. Three of the cases were affected on the left side. One tumor which had originated in the frontal sinus was complicated by a mucocele. Two originated in the fronto-ethmoidal sinuses, and the fourth was complicated by chronic frontal sinusitis and had perforated the frontal bone exposing the dura. The tumors were enucleated. The writer concludes that the pathogenesis varies in each case. (Bibliography, 33 figures.) M. Lombardo.

McKee, S. H. **Primary sarcoma of the uveal tract.** Trans. Amer. Acad. Ophth. and Otolaryng., 1936, 41st meeting, p. 433.

In each of 27 cases of uveal sarcoma, the author found a definite tendency toward production of melanin. In one of the cases death occurred nine years after enucleation. Separation of the

retina was present in all but two cases. In the opinion of McKee, spontaneous detachment of the retina in a nonmyopic eye in patients between the fortieth and sixtieth years should be held in the greatest suspicion. Callender's spindle-cell sub-type A was found to be the most benign type. Callender's cellular classification is of definite value in the prognosis. (Biography, discussion.) George H. Stine.

Rönne, Henning. **On the diagnosis of choroidal melanosarcoma.** Trans. Ophth. Soc. United Kingdom, 1936, v. 56, p. 270.

In three cases exudative retinitis in the region of the macula made diagnosis difficult, but in two cases continued observation prevented enucleation for sarcoma. The third eye was removed and microscopic examination revealed a fibrillary connective tissue between retina and sclera. In other cases diagnosis was aided by direct ophthalmoscopic examination without the mirror but with diascleral transillumination. Two flat sarcomas were removed before the stage of secondary glaucoma. Yellowish discoloration of the retina added the final positive finding. The yellowish color of the retina is due to the peculiar yellow subretinal fluid, so rich in albumin that it coagulates to a solid during the microscopical preparation.

The third group of cases were of genuine cavernous sarcoma. These cases had sudden loss of vision due to hemorrhage into the vitreous, and after rapid resorption a tumor mass was found extending into the vitreous. Microscopic examination revealed the cavernous sarcoma penetrating the retina before extensive involvement of the choroid. Beulah Cushman.

Snell, H. C. **Glioma of the retina treated by radium.** Trans. Ophth. Soc. United Kingdom, 1936, v. 56, p. 269.

The left eye of a child seven months old was removed for glioma, diagnosis of which was confirmed later by pathologic examination. At the time of operation the right eye was examined, and a growth was found covering the lower half of the disc. Fifteen radon seeds of one millicurie each were implanted in the orbit, and the growth had disappeared entirely in six months, but the choroid was very pale over a zone of three to four disc diameters. One year later there had been no recurrence.
Beulah Cushman.

Spinelli, Francesco. **Preoperative and postoperative symptomatology of Rathke's tumors.** Riv. Oto-Neuro-Oft., 1936, v. 13, Nov.-Dec., pp. 489-528.

The report is given of eight patients, five of whom were female, between 6 and 29 years of age, affected by Rathke's cysts. The central vision varied from 20/20 to nil in one or both eyes and corresponding scotomas and different defects of visual fields for form and colors were noted. Descending and postneuritic optic atrophy and papilledema were found at ophthalmoscopic examination. Headache was present in five cases. Radiographic examination revealed an enlargement of the sella in all and signs of cranial hypertension in four cases. X-ray therapy was of no avail. The patients were operated on by the fronto-temporo-parietal route and cysts were found varying in size from a small nut to a hen's egg and containing a chocolate or yellowish-gray fluid. Rathke's cysts are to be considered as suprasellar tumors, and should be operated on early in order to preserve as much of the vision as possible. (Bibliography, 22 figures.)
M. Lombardo.

Stallard, H. B. **Glioma retinae treated by radon seeds.** Brit. Med. Jour., 1936, Nov. 14, p. 962.

The radon seeds were sewn into the sclera over the site of the growth and left in place for ten days. The eye was then enucleated and studied histologically. The effective range of the radon was from 3 to 4 mm. in all directions around the seed. Within this zone necrobiosis, chromatolysis, granulation, and vacuolation occurred. Outside of the 4-mm. radius the neoplasm appeared to be damaged but the histologic changes were not so well marked

nor so uniform as within the 4-mm. radius. M. E. Marcove.

Viktor, Adda. **A case of metastatic carcinoma of the ciliary body.** Zeit. f. Augenh., 1937, v. 91, April, p. 329.

Metastatic carcinoma in the eye involves the choroid of the posterior pole almost exclusively. In this case a metastatic carcinoma was limited to the ciliary body and gradually protruded into the anterior chamber from the root of the iris. The first manifestation, namely, pigmented postcorneal deposits in the sector later found to be the seat of the tumor, led to a diagnosis of cyclitis. With protrusion of the mass into the chamber angle, diagnosis of gumma, tuberculoma, and leucosarcoma had to be considered.

In the histologic preparation, the tumor mass was seen to consist of cylindric cells arranged in a typical gland-like combination and also atypical cell nests. The anterior chamber was lined with a single layer of cylindric tumor cells which covered the inner corneal surface and the iris and in many areas proliferated into the depths of these tissues. F. Herbert Haessler.

Wetzel, J. O. **Melanoblastoma of the lacrimal caruncle.** Amer. Jour. Ophth., 1937, v. 20, July, pp. 675-689.

16
INJURIES

Babenko, I. I. **Variations in intraocular pressure of the fellow eye in ocular traumatism.** Trans. Hirschman Mem. Ophth. Inst., Kharkov, 1935, v. 3, p. 58.

Results of experimental study on rabbits show that painful injury of one eye is associated with rise of intraocular pressure in the fellow eye. This rise is lowered by local anesthesia, and is completely abolished by general anesthesia. Ray K. Daily.

Chepurin, N. O. **Dark adaptation of the fellow eye in ocular injuries.** Trans. Hirschman Mem. Ophth. Inst., Kharkov, 1935, v. 3, p. 75.

A detailed analysis of dark-adaptation tests of the uninjured eyes of 25 patients with perforating ocular injuries. Sixteen patients had disturbances in dark adaptation, while in nine it was normal. The appearance of symptoms of sympathetic irritation such as lacrimation or photophobia is accompanied by lowered dark adaptation and lowered light sensitivity. Surgical procedures arresting the process in the injured eye, such as enucleations or extractions of foreign bodies, are followed by restoration of normal adaptation in the uninjured eye. Ray K. Daily.

Chichkanova, A. H. **The pathologic anatomy of the eyeball in dislocation of the lens into the vitreous.** Viestnik Opht., 1937, v. 10, pt. 2, p. 191.

A detailed report of four cases in which the lens was opaque and located in the anterior portion of the vitreous. In three the lens was intact, and in one disintegrated. The capsule was intact in two cases. In three the lens was fixed to the retina, and one lens was movable. In one case the lens was encapsulated by newly formed connective tissue. From the histopathology of these eyes the author concludes that the primary reaction of a traumatic dislocation of the lens is an inflammatory process in the uveal tract followed by development of chronic endophthalmitis. Organization of the fibrinocellular exudate binds the lens to the retina. Absorption of the lens by leucocytes and epithelioid and giant cells is very slow. The final outcome is secondary glaucoma with the various degenerative corneal changes. Ray K. Daily.

Coppez, Leon. **Retinal detachment and traumatism.** Bull. Soc. Belge d'Opht., 1936, no. 73, p. 104. (See Section 10, Retina and vitreous.)

Gabriélidés, C. **Contributions to the study of emetine keratitis.** Arch. d'Opht. and Rev. Gen. d'Opht., 1937, v. 1, n. s., March, p. 203.

A young physician while injecting emetine hydrochloride into a patient received some drops of the solution in his right eye. Eleven hours later the eye became inflamed and painful. Ex-

amination showed innumerable round gray minute areas of infiltration in the anterior layers of the corneal epithelium, staining with fluorescein. Sensitivity was somewhat diminished. Twelve days after the accident the corneas became normal and vision was restored. The author has found two other cases of emetine keratitis in the literature, presenting different features, and concludes that the corneal alterations depend on the strength of the solution. (Bibliography.)

Derrick Vail.

Hamburger, F. A. **Prophylaxis of serpent ulcer with collargol ointment.** Zeit. f. Augenh., 1937, v. 91, March, p. 265.

During two full years in which two percent collargol ointment was used in all cases of corneal injury, serpent ulcer occurred only once. In this case the eye was infected with diplobacillus and the patient was not seen until 24 hours after the injury. Optochin ointment is equally ineffectual in diplobacillus infections. To forestall the possible objection that serpent ulcer has become rarer the author records the number of cases of serpent ulcer seen at the clinic yearly since 1922.

F. Herbert Haessler.

Judge, H. V. **A new magnet stand for use with large and small magnets.** Arch. of Ophth., 1937, v. 17, March, pp. 518-522.

The unit combines universal adjustment, mobility, and elimination of a motor generator set by means of rectifying tubes, located in a steel box which is mounted on a truck. A hand-operated rheostat controls the current delivered to the magnet, and the efficiency of the magnet may be ascertained from ammeters indicating the amount of current in each circuit.

J. Hewitt Judd.

Lancaster, W. P. **Magnet.** Trans. Sec. on Ophth., Amer. Med. Assoc., 1936, 87th session, p. 278.

Good eye magnets are now being made under Lancaster's supervision.

George H. Stine.

Marin Amat, M. **Vaccine pustule of the cornea.** Bull. Soc. Franç. d'Opht., 1936, v. 49, pp. 85-93.

A physician fifty years of age, in breaking a tube of vaccine lymph, got a particle of glass in his left eye. Eight days later he passed a very bad night with ocular pain and a febrile reaction. Pain over the ciliary body, with myosis, did not respond to repeated doses of atropin. A 5-mm. vaccine pustule developed. There was elevation of temperature, with enormous edema of the lids, marked circumcorneal injection and chemosis of the conjunctiva, enlargement of the neighboring lymph glands, contracted pupil, and extraordinary tenderness on pressure over the ciliary body. By the 21st day there was a huge ulceration of the cornea, whose border was infiltrated with pus. The 24th day the collection of pus between the layers of the cornea occupied one third of the total area of the latter. On the 38th day the ulcer comprised the total extent of the cornea with an abscess in its central third. On the 52nd day the ulcer perforated the anterior corneal layers. Repair then began, and at the end of five months the patient had a total leukomia of the cornea, with no vision.

The author has been able to find only three such cases in the literature.

Clarence W. Rainey.

Martin, Philippa. **Effect on the eye of radium used for treatment of malignant disease in the neighborhood.** Brit. Med. Jour., 1937, March 27, p. 651.

(See Amer. Jour. Ophth., 1935, v. 18, p. 180, and 1937, v. 20, p. 770.) Eyes exposed to radium irradiation of destructive intensity have demonstrated a series of morbid changes leading progressively to radium necrosis of the cornea and loss of the eye.

Natanson, D. M., and Vinogorov, D. P. **The effect of welding on the eye.** Viestnik Opht., 1937, v. 10, pt. 2, p. 280.

A study of 244 welders shows that welding has no deleterious effect on visual acuity or visual fields, and does not produce serious or permanent ocular inflammations. Acute and chronic

electric ophthalmias are frequent. Chronic electric ophthalmia is characterized by conjunctival hyperemia in the palpebral fissure and asthenopia. Corneal sensitivity is found considerably reduced; this being attributed to the effect of light, flying particles of metal, and the chemical composition of the atmosphere. Lenticular opacities cannot be attributed to the occupation.

Ray K. Daily.

Oast, S. P. **Scleromalacia perforans.** Arch. of Ophth., 1937, v. 17, April, pp. 698-701.

A man aged 76 years had received a blow by a chip while chopping wood two years before. After fifteen months a small inflammatory nodule approximately 5 mm. in diameter appeared over the insertion of the superior-rectus muscle. It was slightly painful and red, with a yellowish necrotic center. Caseous material was evacuated. After a few weeks the nodule disappeared, leaving a thin, transparent cicatricial tissue through which the bluish uvea could be seen. While the original nodule was in process of resorption a similar nodule appeared a short distance from the first, and this cycle continued in a counterclockwise direction until it had covered fully two thirds of the eye's circumference. The condition is clearly shown by colored plates. J. Hewitt Judd.

Oliveira Bastos, Fernando de. **Bernard-Horner syndrome in traumatic medullary lesions.** Arquivos do Instituto Penido Burnier (Brazil), 1936, v. 4, Dec., pp. 230-238.

The author emphasizes the importance of ocular symptoms in the diagnosis of cervicodorsal lesions of the cord. Of his three cases, the first had a gunshot wound of the cervical region, with a clear-cut Bernard-Horner syndrome in association with other symptoms pointing to involvement of the nerve roots and the sympathetic system; the second had a gunshot lesion of the superior dorsal region; and the third a similar lesion of the lower cervical cord; both of these two latter cases having a hematomyelia whose clinical expression was the Brown-Séquard syndrome in association with the Bernard-Horner syndrome. The third patient also had muscular atrophy of the hands, of the Aran-Duchenne type.

W. H. Crisp.

Rameev, P. C. **Cosmetic ophthalmia.** Sovietskii Viestnik Opht., 1936, v. 9, pt. 4, p. 509.

Brief reports of eight cases, one of bilateral corneal ulcers, two of keratitis, two of acute photo-ophthalmia, two of ulcerative blepharitis and dermatitis of the lids, and one of recurrence of a chronic exfoliative blepharitis caused by dyeing of eyelashes.

Ray K. Daily.

Rieger, Herwigh. **Wound infection of the eyeball with irritants of the gas-gangrene group.** Graefe's Arch., 1937, v. 137, pt. 1, p. 61.

In review of his five cases together with those in the literature, the author found that the majority of cases of gas-gangrene infection of the eyeball were cases of injury from metallic particles. The slight extent of the penetrating wound was noteworthy. In a considerable number of patients, the opportunity for contamination of the damaging agent with earth or dust was definitely established. In cases already developed when first seen, no remedial measures, including gas-gangrene antitoxin, were of any help. But opening or removal of the diseased eye almost always produces rapid improvement of the general symptoms.

H. D. Lamb.

Semon, H. C., and Oxon, D. M. **Palpebritis from eyelid "shading."** The Lancet, 1936, v. 231, Nov. 28, p. 1267.

Four cases of inflammation of the eyelids due to the use of aniline-dye pigments for eyelid shading are reported. In two of these the patch tests were entirely negative but the condition cleared up at once when the practice of eyelid shading was discontinued. The author ascribes the negative patch tests to the fact that the skin of the eyelids is more delicate than the skin surfaces of the back or forearm where the patch test is usually applied.

Edna M. Reynolds.

Tillema, A. **Traumatic glaucoma.** Arch. of Ophth., 1937, v. 17, April, pp. 586-647.

The author reviews the cases reported in the literature and adds two in which complete microscopic examination of serial sections was made. The following anatomic changes were recorded: partial rupture of sclera, pectinate ligament, lamina cribrosa, and optic nerve; tear and partial necrosis of the iris; necrosis of the ciliary body; rupture of choroid and retina; rupture of ciliary and vortex vessels in the inner layers of the sclera; subluxation of lens; and isolated degeneration of bundles of ciliary nerves. The clinical study is based on five cases of traumatic glaucoma and fifteen cases of simple contusion, in which slight intraocular lesions and varying degrees of instability of tension were present. An analysis of all the cases reported in the literature is made and the data tabulated. Traumatic glaucoma occurs at any age. A common feature is the fact that the objects strike the eye with great velocity. The majority of cases occur in the first week after contusion. Dislocation of the lens is accompanied by other severe intraocular damage and constitutes a symptom but not the cause of the disease. Simple hypertony and hypotony may be regarded as reactions of a normal mechanism to a blow, and traumatic glaucoma as a pathologic effect. To the former, a healthy neurovascular system readjusts itself, in the latter it is hampered by lesions in the nervous system, such as are demonstrated microscopically in these cases. The use of mydriatics after contusions should be very cautious, and miotics should be used if increased tension occurs. If the latter prove insufficient, it is advisable to try paracentesis or a filtration operation. (Bibliography.)

J. Hewitt Judd.

Varshavskii, I. K. **Electromagnetic operations.** Sovietskii Viestnik Opht., 1937, v. 9, pt. 4, p. 501.

The results of 193 cases are analyzed. The conclusions are that best results are obtained from immediate extraction by the anterior route.

Ray K. Daily.

17
SYSTEMIC DISEASES AND PARASITES

Borsello, Giuseppe. **A case of ophthalmomyiasis of the anterior chamber.** Rassegna Ital. d'Ottal., 1936, v. 5, Sept.-Oct., p. 604.

The patient was a 13-year-old boy who for three weeks had been suffering from periodic redness and severe pain of the right eye. The cornea was hazy. There were deep circumcorneal injection, dilated pupil, deep anterior chamber, and tension of 54 mm. Schiötz. Following the use of pilocarpine the media cleared and a larva was plainly seen in the anterior chamber. Because of a firm attachment to the iris by one of the hooklets, it was necessary to perform an iridectomy. Prompt recovery followed. The larva presented an elongated fusiform white body with rounded head and somewhat pointed tail. There were eight segments in the body. The head was surrounded by a corona of small spines. The larva was diagnosed as belonging to the Hypoderma bovis or Hypoderma lineatum. Only twelve similar cases have been described in Europe and two in North America. A review of cases and literature and a classification of Diptera are included. (2 figures.)

Eugene M. Blake.

Butler, T. H., and Wilson, A. J. **Ocular paralysis following mumps.** Brit. Med. Jour., 1937, April 10, p. 752.

A case of paralysis of accommodation accompanied by palatine paralysis of the postdiphtherial type, which came on one week after an attack of mumps, is reported. Recovery was complete.

A case of paralysis of all the intrinsic and extrinsic muscles supplied by the third nerve on the left side, which came on six weeks after mumps, is also reported. In this case there was no improvement in the condition eighteen months later.

Edna M. Reynolds.

Dérer, Josef. **A case of ophthalmomyiasis interna.** Klin. M. f. Augenh., 1937, v. 98, March, p. 339.

A peasant boy of seven years had a

living larva of the fly Wohlfartia magnifica in the anterior chamber of his right eye. The eye had been inflamed and painful for about seven weeks, with loss of vision. The larva was extracted with forceps through an incision at the upper limbus. It consisted of nine segments and was about 8 mm. long and 1 mm. thick. The eye soon quieted down and the aqueous became clear, so that the lower temporal margin of the lens, dislocated upward and to the nasal side, could be seen in the pupil. After the vitreous cleared ophthalmoscopic examination revealed atrophy of the optic nerve and a whitish opaque focus at the lower part of the retina, but no detachment. There was only light perception, no projection. The lens gradually became opaque. As there was no injury of the sclera the retinal changes suggested the possibility that the larva had entered the eye through the blood stream, and had migrated into the anterior chamber. (Illustration.)

C. Zimmermann.

Gallo-Basteris, Allesandro. **Filariasis of the ocular structures.** Rassegna Ital. d'Ottal., 1936, v. 5, Sept.-Oct., p. 584.

The author gives a description of the various forms of filaria which are known to invade man. He reports the case of a 41-year-old woman who had lived for a year in the Belgian Congo and who, 26 months after her return to Italy, developed eye symptoms. At times she experienced discomfort and a sensation of movement in the right upper lid, and at other times lacrimation, and burning and redness of the eye. A motile mass was seen under the skin of the upper lid and later a worm was observed beneath the bulbar conjunctiva. A nematode, identified as Filaria loa was extracted from the latter site. A description of the life cycle and structure of the worm is given, also a review of the literature. (4 figures.)

Eugene M. Blake.

Guliakov, M. F. **A case of cysticercus in the anterior chamber.** Sovietskii Viestnik Opht., 1936, v. 9, pt. 4, p. 512.

A report of a case of cysticercus attached to the anterior capsule of the lens and producing recurrent attacks of iritis. Its removal through an incision in the upper limbus was followed by development and absorption of a traumatic cataract. Ray K. Daily.

Halbron, Pierre. **Clinical study of certain oculonasal nervous interreactions.** Ann. d'Ocul., 1937, v. 174, March, pp. 145-167.

Reflex disturbances of the eyes may have a nasal origin. The two outstanding conditions are Charlin's syndrome of the nasal nerve and Sluder's syndrome of the sphenopalatine ganglion. The syndrome of the nasal nerve is characterized by pain, ocular inflammation, and rhinorrhea. The pain may be superficial or deep, and is intermittent in character, occurring in crises lasting from ten minutes to over an hour. There may be either iritis or corneal ulceration accompanied by intense lacrimation, photophobia, and blepharospasm. The profuse rhinorrhea is serous in type. Pressure over the upper nasal portion of the orbit or over the ala of the nose produces pain. The application of cocaine to the lateral nasal wall immediately stops all symptoms.

The syndrome of the sphenopalatine ganglion usually begins with rhinorrhea, redness, and swelling of the nasal passages. These are accompanied or followed by pain in the nose, behind the eye, and at times in the temple, ear, mastoid, or neck. There are tearing, photophobia, and conjunctival redness. Rarely mydriasis and exophthalmos are found. Cocainization of the nasal mucosa over the sphenopalatine ganglion or injection of an anesthetic into the ganglion is effective, but to obtain permanent relief it is usually necessary to correct the underlying nasal or systemic condition.

John C. Long.

Lijo Pavia, J., and Galindez, J. **Anterior-segment tuberculosis.** Rev. Oto-Neuro-Oft., 1937, v. 12, March, p. 59.

On the basis of a study of 77 children less than fifteen years of age, with an average positive Mantoux of 89 percent and presenting either phlyctenular conjunctivitis, keratoconjunctivitis,

keratitis, keratoscleritis or episcleritis, the authors suggest that we are dealing here with manifestations due to a mutation form of Koch's bacillus. In determining the etiologic factor in the keratitis cases, aside from the negative Wassermann and general habitus and evidence of tuberculosis, the slight subjective symptoms out of proportion to the intensity of the lesions, the nocturnal exacerbations, the abundant vascularization, and the tendency to phlyctenular formations were considered as characteristic. Factors in the formation of phlyctenules are avitaminosis and intestinal intoxication.

M. Davidson.

Lisch, Karl. **Hereditary occurrence of Sjögren's symptom complex with keratoconjunctivitis sicca.** Arch. f. Augenh., 1937, v. 110, March, p. 357.

Keratoconjunctivitis sicca is a local symptom of a general disease. It is more prevalent among females and is caused by sclerosis of the secretory glands on the basis of a focal infection. The tear glands, the parotid, and the glands of the upper respiratory tract are mostly involved. The author demonstrates the hereditary occurrence of this disease. Among thirteen members of one family of three generations eleven showed one or more symptoms of the disease. Most patients complained of dryness in the mouth, nose, and throat, and inability to swallow dry food. In two cases filiform keratitis with diminished corneal sensibility, and in three cases chronic arthritis of fingers and toes was found. Other common findings were rheumatic affections and sciatica, and subacidity of the stomach. In two cases the blood sedimentation was increased.

R. Grunfeld.

Marbaix and Appelmans. **Punctate keratitis of filarial origin.** Bull. Soc. Franç. d'Opht., 1936, v. 49, pp. 74-84.

A woman 28 years old, who had lived in the Belgian Congo six years, presented herself with the ocular and general symptoms of taenial infestation. The ocular symptoms included photophobia, variable edema of the lids, pain on opening the eyes, and deep redness of the palpebral conjunctiva, but without discharge. With ordinary daylight the cornea showed some gray circinate dots which were superficial, punctate, and non-ulcerated. These were numerous and confluent near the lower limbus. The middle part of the cornea was less affected and the upper third was intact. The site of the opacities was in the superficial layers. The other eye findings were normal. The vision was not affected in either eye. There was no neighboring adenopathy. Cutaneous lesions are described. The blood showed eosinophilia. The disease was marked by remissions and exacerbations.

A month after the first visit the patient had an attack of marked swelling of the lids accompanied by itching and urticaria of the skin, which lasted some three days. Later there appeared in the right eye a whitish swelling the size of a pin head, 4 mm. above and to the outside of the limbus. Anatomic examination of the biopsy specimen, fixed and stained with hematoxylin-eosin-safran, disclosed an inflammatory nodule. Many fragments of microfilaria were found in the adenoid layer of the conjunctiva. Treatment consisted in administration of emetine hydrochloride intravenously. Following the first dose there was exacerbation of the symptoms, but a month later the eosinophilia had fallen from 54 to 24 percent and the corneal opacities were less numerous.

Clarence W. Rainey.

Mayer, L. L. **The eye in epilepsy.** Arch. of Ophth., 1937, v. 17, March, pp. 486-492.

The report is based on examination of 96 patients, including both functional and organic types. No consistent changes in the eyes or the ocular fundi were evident, and the conditions found were for the most part incidental to the disease. It is pointed out that there is no direct relation between errors of refraction and epilepsy.

J. Hewitt Judd.

Saverukha, F. M. **Ophthalmomyiasis of the lid.** Viestnik Opht., 1937, v. 10, pt. 2, p. 108.

A review of the literature and a report of a case of invasion of the lids in a child three years of age by the ova of Hypoderma bovis. (Illustration)

Ray K. Daily.

Van Duyse and Van Canneyt. **Syphilitic lesions induced by injection of septic material into the retrobulbar cavity of the hare.** Bull. Soc. Belge. d'Opht., 1936, no. 73, p. 140. (See Amer. Jour. Ophth., 1937, v. 20, July, p. 771.)

Weekers, L., and Barac, G. **Ocular manifestations of Quincke's edema. Allergic paroxysmal intraocular edema.** Arch. d'Opht. and Rev. Gen. d'Opht., 1937, v. 1, n. s., March, p. 193. (See Amer. Jour. Ophth., 1937, v. 20, July, p. 772.)

18

HYGIENE, SOCIOLOGY, EDUCATION, AND HISTORY

Bassin, R., and Škerlj, B. **Ocular disturbances and eye color.** Klin. M. f. Augenh., 1937, v. 98, March, p. 314.

The color of the eyes of school children, 2,848 boys and 1,964 girls aged from 6 to 22 years, was studied in relation to errors of refraction (by skiascopy without mydriatics), follicular conjunctivitis, and blepharitis. Medium and severe errors of refraction, myopic and hyperopic, were more frequent in light than in dark eyes. Slight errors of refraction were more frequent in dark eyes. Follicular conjunctivitis and blepharitis were twice as frequent in blue and gray eyes, and in brown eyes they were about one third more frequent than in light gray eyes. In the main the results were identical in both sexes.

C. Zimmermann.

Chance, Burton. **Short studies on the history of ophthalmology. 4. Sir Clifford Allbutt, the apostle of medical ophthalmoscopy.** Arch. of Ophth., 1937, v. 17, May, pp. 819-858.

This biography outlines Allbutt's early training and discusses the influence of Ogle and of Teale in stimulating his interest in ophthalmoscopy, and of Hughlings Jackson in stimulating his interest in neuro-ophthalmology. His monograph on the use of the ophthalmoscope, in 1871, was the first book in English on this subject.

J. Hewitt Judd.

Dashevskii, A. I. **The morphology of the eyeball in relation to the morphology of the body.** Trans. Hirschman Mem. Ophth. Inst., Kharkov, 1935, v. 3, p. 141.

Studies were made on 700 workers of a Jewish agricultural colony and on 300 workers at a Slavic health resort. The oculometric studies consisted of measurements of the length and width of the palpebral fissure, the vertical and horizontal corneal diameters, the prominence of the eyeball as measured by the Hertel exophthalmometer, interpupillary distance, and refraction. The conclusions are that there is no relation between constitutional type and the morphology of the eyeball.

Ray K. Daily.

Evans, J. N. **Organization of the department of ophthalmology of the Long Island College of Medicine.** Arch. of Ophth., 1937, v. 17, April, pp. 702-704.

The organization and program of training for fellows and residents in ophthalmology are outlined.

J. Hewitt Judd.

Hughes, C. A. **Congenital dyslexia.** Trans. Ophth. Soc. United Kingdom, 1936, v. 56, p. 307.

In the study of an intelligent and excellent workman 26 years old, who could neither read nor write, the author discovered that the visual acuity was normal with correction of 0.5 D. of hypermetropic astigmatism. The man could not read words or numbers of three or more letters. He also made errors in transcription. The author concludes that the condition was congenital.

Beulah Cushman.

Iufa, N. Z. **A statistical study of tuberculous and scrofulous eye diseases.** Sovietskii Viestnik Opht., 1936, v. 9, pt. 4, p. 485.

This is a study of the material of the eye clinic of the Kharkov Medical Institute for 1930-1934. The percentage

of scrofulous infections was 3.8 percent and that of tuberculous infections 1.5 percent. Scrofulous diseases are more prevalent among females, particularly in childhood and adolescence. Tuberculosis shows no such selectivity. The greatest incidence of scrofulous diseases is during the first five years of life; after that the number falls sharply among the boys and slowly among girls. In the second five years of life the number having scrofulous disease is one tenth of the number found in the first five years. The severity of the disease is also greater in youth, when corneal complications are frequent. Children from the rural districts are more frequently affected than the children of the cities. The tuberculous material consisted of 45 percent cases of kerato-uveitis, 30 percent choroiditis, and 15 percent anterior uveitis.

Ray K. Daily.

Kaz, R. A. **Children with defective vision.** Brit. Jour. Ophth., 1937, v. 21, May, pp. 242-244.

The article has to do with children who do not see well enough to attend regular schools and who yet see too well to attend schools for the blind. (References.) D. F. Harbridge.

Lancaster, W. B. **Educational standards of ophthalmology that must be met at this time.** Arch. of Ophth., 1937, v. 17, March, pp. 399-407.

The author sets forth the standards for candidates for the certificate of the American Board of Ophthalmology, the standards to be met by schools and hospitals, and those required by the Advisory Board for Medical Specialties. He advocates a minimum of three months of all-day training on basic subjects, followed by at least twelve months of clinical work, during which systematic teaching is carried on for two periods a week, with time provided for study in library and laboratory.

J. Hewitt Judd.

Lawson, Arnold. **Talking book for the blind.** Trans. Ophth. Soc. United Kingdom, 1936, v. 56, p. 239.

The talking book is of special value to persons who become blind after the age of forty years, as the large majority have great difficulty in learning Braille.

Beulah Cushman.

Quint, C. **Is the artificial eye a corrective or auxiliary agent?** Klin. M. f. Augenh., 1937, v. 98, March, p. 347.

With enucleation of an eye the healing process is not terminated. The lids, deprived of support, fall back and exert constant friction on the conjunctiva, leading to thickening, increased secretion, and shrinkage of the conjunctiva. Often mucopurulent discharge produces eczema of the skin of the lids and surroundings, and not rarely the disturbance is propagated to the conjunctiva of the other eye and causes chronic irritation. All these abnormal conditions are prevented by constant wearing of an artificial eye. Hence from the medical standpoint the artificial eye must be considered as a remedy. C. Zimmermann.

Rabkin, E. B., and Miller, I. H. **The problem of reducing the frequency of ocular diseases in the Ukraine.** Trans. Hirschman Mem. Ophth. Inst., Kharkov, 1935, v. 3, p. 131.

A statistical survey shows greater incidence of infectious eye diseases and affections of the cornea in rural districts, and decided reduction in trachoma and blindness since institution of the Soviet Sanitation Service.

Ray K. Daily.

Ronne, Henning. **Congenital word-blindness in school children.** Trans. Ophth. Soc. United Kingdom, 1936, v. 56, p. 311.

The tremendous difference in facility wherewith children learn to read corresponds to the diversity of musical ability. The difficulty is not with the visual organs or their nerve connections, but in the cerebral center which directs the power of reading. Congenital dyslexia due to faulty development remains as a rule unrecognized and undiagnosed. The child may learn readily when lessons are read aloud.

A test is given for estimation of rate and accuracy of reading, as an aid in

diagnosis. The author formulates special rules for instruction of these children: (1) Emphasize reading for amusement rather than ordinary school reading. (2) Reading lessons should be as lengthy as possible, but should be read only a few times, otherwise they are memorized. (3) Copy frequently from written text to prevent false word-pictures. (4) In obtaining correct spelling no importance should be attached to neatness. (5) As far as possible the affected children must accompany normal children in passing from class to class.

Beulah Cushman.

Saretzjaye, R. B. **The data of a test on the hygiene of the eye among school children.** Trans. Hirschman Mem. Ophth. Inst., Kharkov, 1935, v. 3, p. 163.

A report on 237 Kharkov school children, 11 to 15 years of age, who were examined for their knowledge on hygiene of the eye. The graphic data lead the author to conclude that the education in this field is inadequate to raise the popular level in sanitary hygiene. A continuous course would be more effective than the campaign method in use. Ray K. Daily.

Tumarkina, M. A., and Ostrovskaja, M. H. **Vocational efficiency of one-eyed people.** Viestnik Opht., 1937, v. 10, pt. 1, p. 143.

Using the Ferree and Rand test for ocular fatigue, the authors found that the time of maintenance of clear vision was considerably greater with two eyes than with one. Subsequent tests show the loss with one eye to be permanent. Stereoscopic vision is sharply disturbed through loss of one eye and is not restored in the course of a year.

Ray K. Daily.

Van Heuven, J. A. **Visual acuity in excessive illumination.** Acta Ophth., 1937, v. 15, pt. 1, p. 109.

A review of the early investigations and the source of their errors, and a description of the author's experimental set-up and tabulated findings. The visual-acuity functions for this purpose are the ability to differentiate between fine lines, and the optical localization of form. In such studies it is necessary to record not only the intensity but also the source of illumination, and the size of the opening. Excessive illumination impairs these two functions in all stages of adaptation.

Ray K. Daily.

19

ANATOMY, EMBRYOLOGY, AND COMPARATIVE OPHTHALMOLOGY

Tansley, K., Spear, F. G., and Glucksmann, A. **The effect of gamma rays on cell division in the developing rat retina.** Brit. Jour. Ophth., 1937, v. 21, June, pp. 273-398.

The authors describe a method for administering relatively accurate doses of gamma radiation to the developing rat eye. Two-day-old rats, the left eye being irradiated, were used in a series of experiments. A statistical analysis of both irradiated and nonirradiated eyes is used to show the variation of mitotic counts. (5 statistical tables, 1 figure, references.) D. F. Harbridge.

NEWS ITEMS

Edited by Dr. H. Rommel Hildreth
640 S. Kingshighway, St. Louis

News items should reach the Editor by the twelfth of the month

Societies

The third annual meeting of the Mississippi Valley Medical Society will be held at Quincy, Illinois, September 29th, 30th, and October 1st. A most ambitious program has been arranged consisting of 48 teachers and clinicians who will give over 60 lectures and demonstrations in the three-day intensive session. The first day will be an All-St. Louis program with 18 clinicians participating; on the second day there will be groups from Rochester and Chicago; on the third day the speakers will come from a wide

territory. An innovation this year will be two short courses of instruction (4 hours each): one on "Surgery of the neck" by Dr. Lindon Seed, Associate Professor of Surgery, University of Illinois College of Medicine; the other, "Interpretation of clinical laboratory findings" by Dr. M. Pinson Neal, Professor of Pathology, University of Missouri School of Medicine. At the annual banquet to be held on September 30th, the speakers will include Dr. R. K. Packard, President, Illinois State Medical Society; Dr. D. S. Conley, President, Missouri State Medical Society and Dean of the University of Missouri School of Medicine; Dr. E. M. Myers, President of the Iowa State Medical Society; and Rev. A. M. Schwitalla, Ph.D., Dean of St. Louis University School of Medicine. There will be large technical and scientific exhibits. A complimentary stag supper will be given on September 29th. The meeting is open to all ethical physicians. A detailed program may be obtained from Dr. Harold Swanberg, Secretary, 209-224 W.C.U. Building, Quincy, Illinois.

The following members of the Washington, D.C., Ophthalmological Society were elected to office for the next two years: Dr. G. Victor Simpson, president; Dr. Ernest Sheppard, vice-president; Drs. James N. Greear and E. Leonard Goodman, members of the executive committee; Dr. Frank D. Costenbader, secretary-treasurer. The place of meetings will continue to be the Episcopal Eye and Ear Hospital, 1147 Fifteenth Street, N.W., at 8:00 P.M., on the first Monday in November, January, March, and May.

Personals

Dr. Francis P. Guida, for the past two years Resident in Ophthalmology at Yale, has been appointed full-time Instructor in Ophthalmology at the University of Chicago.

Dr. Louis Bothman has been promoted to the position of Clinical Professor of Ophthalmology at the University of Chicago.

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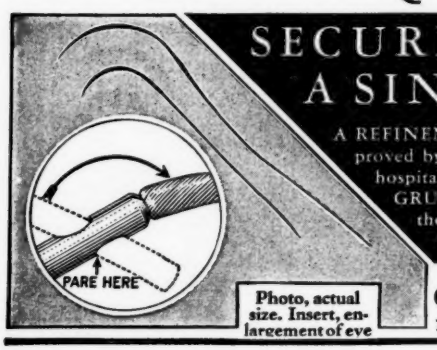

Photo, actual size. Insert, enlargement of eye

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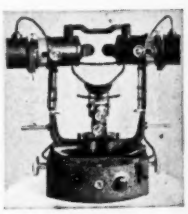

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FIG. 1 (ALLEN). RABBIT'S EYE SIX HOURS AFTER INSTILLATION OF ONE DROP OF STAPHYLOCOCCUS TOXIN.

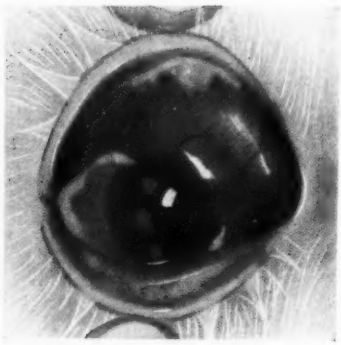

FIG. 2 (ALLEN). RABBIT'S CORNEA STAINED WITH FLUORESCEIN AFTER TEN DROPS OF STAPHYLOCOCCUS TOXIN.

FIG. 3 (ALLEN). RIGHT EYE AFTER INSTILLATION OF ONE DROP OF STAPHYLOCOCCUS TOXIN, T. I. D. LEFT EYE AFTER INSTILLATION OF TWO DROPS OF TOXIN-ANTITOXIN, T. I. D.